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The Morgan Producer Gas Machine

Mechanically Operated to Gasify 3000 Lb. of Coal per Hour—Spreading of Coal, a Measuring Feeder and Distribution of Blast the Features

The Morgan Construction Company, Worcester, Mass., has developed a producer gas machine that because of radical improvements in mechanical design will convert 3000 lb. of coal per hr. into gas without hand labor, thus constituting an important advance over existing practice. The manufacture of producer gas has been dominated to a large extent by the idea that a gas-making fire must be frequently disturbed—poked or twisted or broken up—in order to make gas in large quantity. Much ingenuity has been expended on the assumption that mechanical means should be employed in accomplishing results in these ways. The Morgan Construction Company for some years worked in this direction and various mechanical devices resulted, but it was found that the output was not commensurate with their cost and that they represented no fundamental improvement upon earlier methods. All mechanical means employed to prevent clinker or to break it up inevitably created new variations in the density of the fuel mass.

The basis on which work was begun on the machine that is now brought out is that if the coal is spread properly and the surface leveled continuously, the fire needs only to be let alone; that later disturbances causing variations in density create hot places, with resultant clinkers and inferior gas. The mechanical leveler, Figs. 1-3, floats on the fuel and permits of any variation in height.

The proper removal of ash is almost as important a factor. In the Morgan machine the ash pan is

swept by a spiral-shaped bar or plow, the result being a uniform settling of ash over the whole area. The action is automatic. When the operator desires to remove ash he sets a lever. The plow is held stationary during one complete revolution of the

pan and is then released automatically. The ash is discharged at one final point into a conveyor or car. Since there is no agitation and the walls are free from obstructions, the coke is undisturbed and its temperature is maintained until it is consumed, the result being an ash practically free from carbon.

An even distribution of the blast over the gas-making area is essential in order that each square foot of fuel bed shall gasify at the same rate. In designing this machine the central blast hood was discarded as inadequate to the high capacity demanded. Instead, as shown in Fig. 2, the blast is delivered from the three hollow radial arms, around the circumference of the hollow ring, or mantle, the result being a gentle, sustained blast pressure which is

evenly distributed over the whole surface.

The company's engineers have found that the matter of firebrick lining has been given relatively little consideration, whereas it is, in reality, an important factor. The inner surface of the bricks should not become sufficiently hot to permit of fusing with the ash and thus create clinging clinkers. The remedy was to reduce the thickness of the firebrick and surround it with a water jacket, which keeps it cool enough on the inner surface to prevent any slagging action.

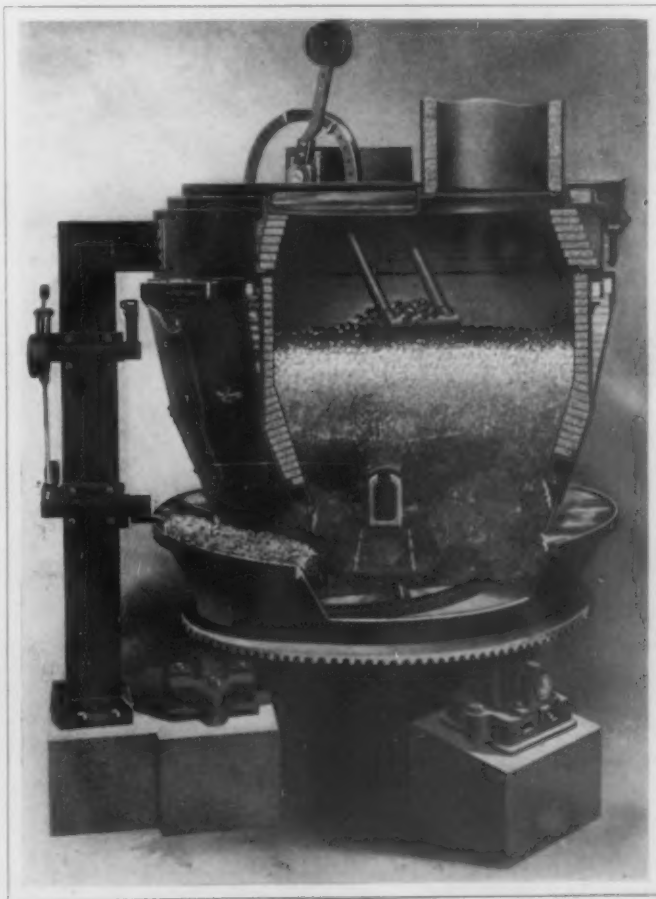


Fig. 1—The Morgan Producer Gas Machine

An important feature of the gas-producing machine is the means of feeding mechanically and with required regularity small quantities of coal. The new feeder, Fig. 4, receives the coal from the bin and charges it in small and uniform quantities at frequent intervals. As a consequence one man can take care of a battery of six machines gasifying 9 tons per hr.

Severe tests of the new fea-

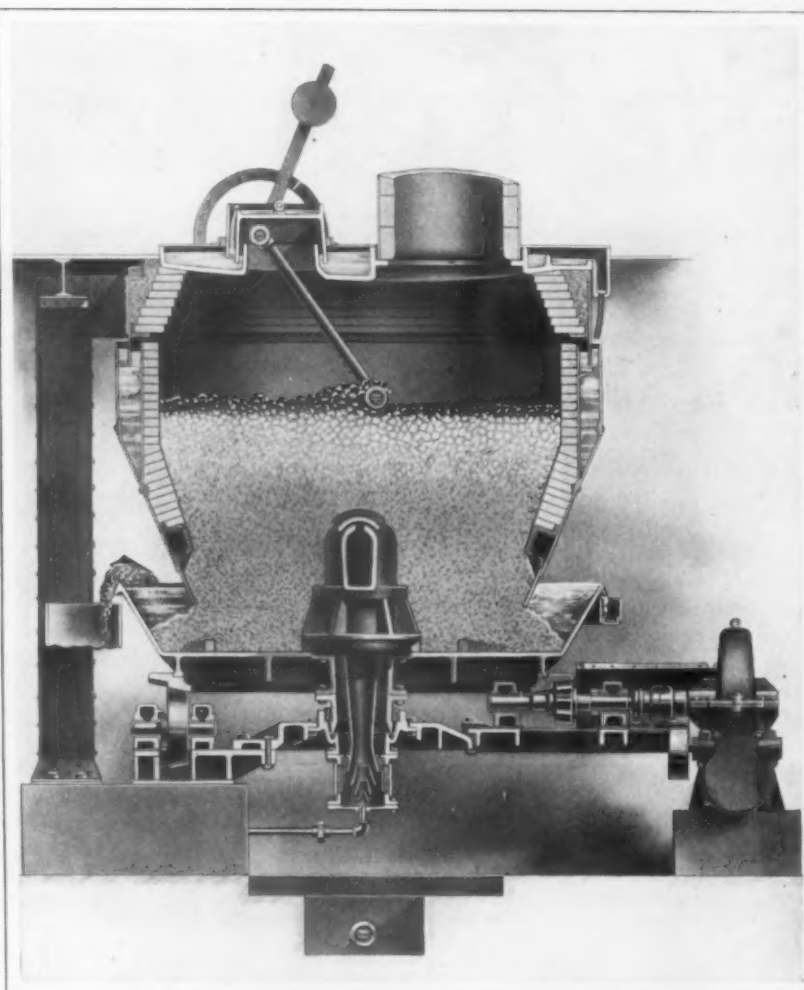


Fig. 2 — Cross-section of Producer Gas Machine Showing Leveler in Action on One Side of Center of Revolving Fuel Bed. The leveler accommodates itself to variations in the height of the fuel surface and causes no dis-

tures have been made under industrial conditions. With one of the earlier machines of the type, installed by a large steel company, the opportunity was afforded last year to take continuous 12-hr. samples of the gas day and night for several weeks. The detailed analyses were made by the works chemist and are noteworthy on account of the low CO_2 and the high heat value and regular quality of the gas. The

turbance within the bed. It compacts the coal uniformly and continuously. Also is shown the blast distribution from the hollow arms and around the entire circumference beneath the mantle ring supporting the lining

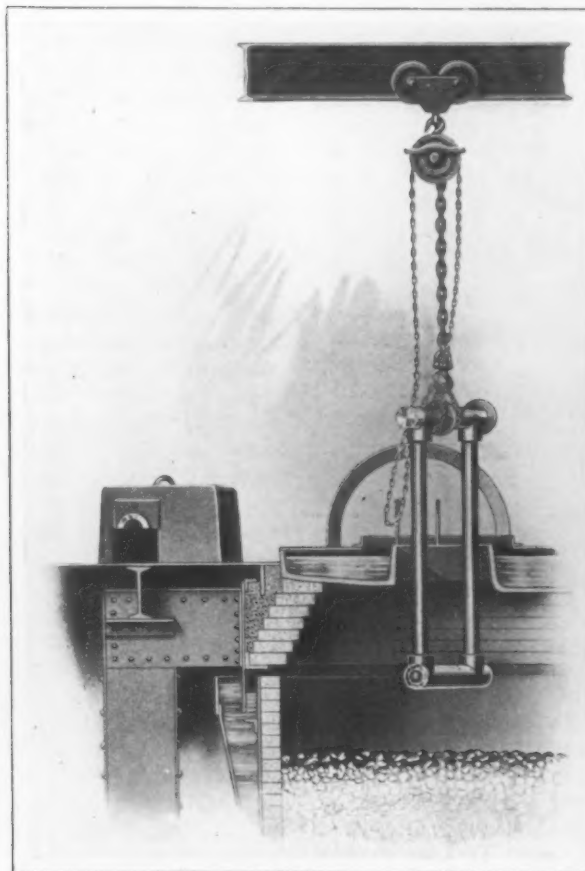


Fig. 3—Removing the Fuel Leveler. Under normal conditions the water-cooled bar lasts about one year, but in case the water is shut off frequently or for long periods it is liable to wear rapidly. It can be changed in 20 min.



Fig. 4—Exterior View Showing the Measuring Feeder in Place. The feeder receives the coal continuously from an overhead bin and scatters it in small charges over the slowly revolving fuel bed. The feed can be varied from 500 to 4000 lb. per hr.

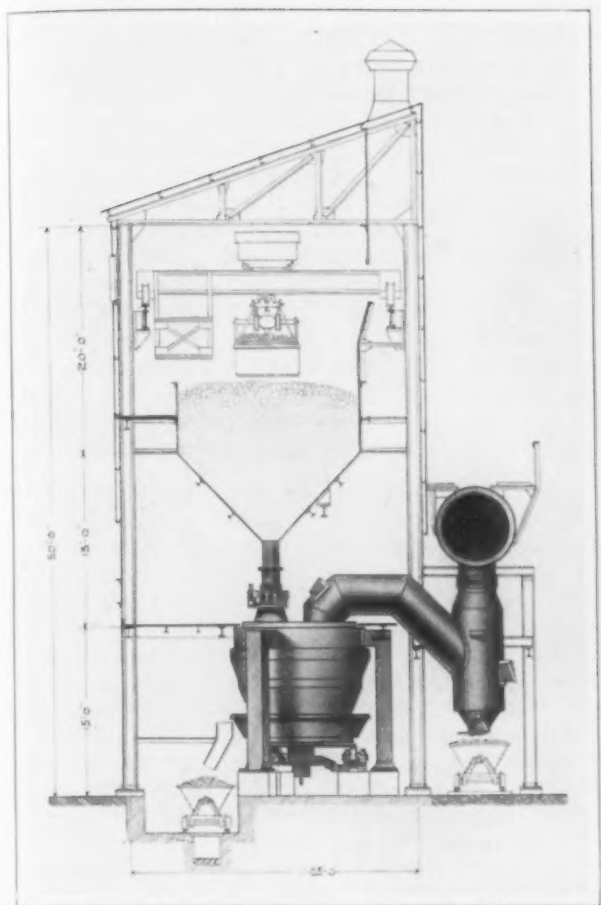


Fig. 5—Cross-section of a Ventilated Gas House with Over-head Coal Bunkers and Crane Service, Showing the Direct Connection with the Feeder, the Mounting of Ash Spout and Ash Car and the Arrangement of Gas Outlet, Header Flue and Soot Collector

results for one week are presented in detail in Table 1, together with the averages for the preceding week:

Table 1.—Analyses of 12-hr. Continuous Gas Samples

Feb., 1914	CO ₂	C ₂ H ₄	CO	H ₂	CH ₄	B.T.U.	
						U. S. Steel standard	Total 32 deg. F.
9 Day.....	3.0	0.3	25.6	10.5	4.6	158.5	178.5
9 Night.....	2.7	0.6	25.8	11.4	2.4	149.0	168.0
10 Day.....	3.0	0.8	28.0	11.7	3.0	162.5	183.0
10 Night.....	3.5	0.4	26.4	11.7	3.3	154.0	173.5
11 Day.....	2.5	0.8	27.2	11.4	4.0	168.0	189.0
11 Night.....	2.8	0.4	27.2	11.4	2.8	151.5	170.5
12 Day.....	2.4	0.5	28.2	11.4	3.9	166.0	187.0
12 Night.....	3.0	0.8	27.5	11.7	1.6	148.0	166.5
13 Day.....	2.5	0.6	28.5	9.3	4.2	165.5	186.0
13 Night.....	3.0	0.8	27.4	11.7	2.9	160.0	180.0
14 Day.....	2.8	0.7	28.0	10.2	4.1	167.0	188.0
Average.....	2.8	0.6	27.3	11.1	3.4	159.0	179.0
Average 2-7.....	2.8	0.6	27.4	11.4	3.6	162.0	182.5

During some of the periods an accurate account of the quantity of coal gasified was kept. The average was 2766 lb. coal per hr. for 120 hr. from February 9 to 14 with gas of 178 B.t.u. The data by days are presented in Table 2:

Table 2.—Quantity of Coal Gasified in Continuous Operation

Feb., 1914	Average lb. coal per hr.	AVERAGE B.T.U. PER CU. FT. OF GAS	
		U. S. Steel standard	Total 32 deg. F.
9 Day.....	2,800	158.5	178.5
9 Night.....	2,740	149.0	168.0
10 Day.....	2,740	162.5	183.0
10 Night.....	2,690	154.0	173.5
11 Day.....	2,740	168.0	189.0
11 Night.....	2,690	151.5	170.5
12 Day.....	2,800	166.0	187.0
12 Night.....	2,860	148.0	166.5
13 Day.....	2,800	165.5	186.0
13 Night.....	2,800	160.0	180.0
Average.....	2,766	158.5	178.0

In another case, where open-hearth furnaces were operated analyses of an 8-hr. continuous sample of the gas were made practically every day. These records cover a period of five months and average 3.5 per cent. CO₂, 28.8 per cent. CO and 182 B.t.u. The analyses for the week September 21-26, 1914, are given in Table 3 with averages for the two previous weeks:

Table 3.—Analyses of 8-hr. Continuous Gas Samples

Sept., 1914	CO ₂	C ₂ H ₄	CO	H ₂	CH ₄	B.T.U.	
						U. S. Steel standard	Total 32 deg. F.
21	3.5	0.9	28.8	12.3	2.6	165.0	185.5
22	3.3	0.9	29.9	12.2	2.6	168.5	189.5
23	3.1	0.9	30.1	12.9	2.4	169.0	190.5
24	3.2	0.8	29.2	11.1	2.6	161.5	181.5
25	2.8	0.9	29.9	12.6	2.6	169.5	191.0
26	4.0	0.8	27.6	12.4	2.7	160.5	180.5
Average.....	3.3	0.8	29.2	12.2	2.6	166.0	186.0
Average 8-12.....	3.5	0.7	29.8	11.6	2.7	165.5	185.0
Average 14-19.....	3.6	0.8	28.7	12.1	2.6	163.0	183.0

Recently the same owners desired to determine on what gasifying capacity they could safely count as a guide to their future requirements. After increasing the rate to 3260 lb. coal per hr. they decided they could safely rely on a working capacity of 3000 lb. per hr. The results are given in Table 4:

Table 4.—Gasifying Capacity of 10-ft. Producer Gas Machine

Sept., 1914	Net tons coal per day	Operating hours per day	Coal per hr., lb.	B.T.U. OF GAS	
				U. S. Steel standard	Total 32 deg. F.
21-22	32.35	23.70	2,730	167.0	188.0
22-23	36.00	23.05	3,120	168.5	190.0
23-24	34.15	22.05	3,100	165.0	186.0
24-25	37.35	22.90	3,260	165.5	186.5

Measurements taken during several weeks showed a consumption of 1/6 lb. of steam per lb. of coal. The power required to operate the machine is 3/4 hp. at the driving gear for each machine as a uniform load, with the exception that for 15 min. each 12 hr., while plowing ash there is an increase to 1 1/2 hp. Operating parts are designed in accordance with the Morgan rolling mill practice, with bearings provided with bushings to facilitate renewals, and protection from dirt and dust and positive lubrication are included in the design.

Increasing Coke Consumption in Germany

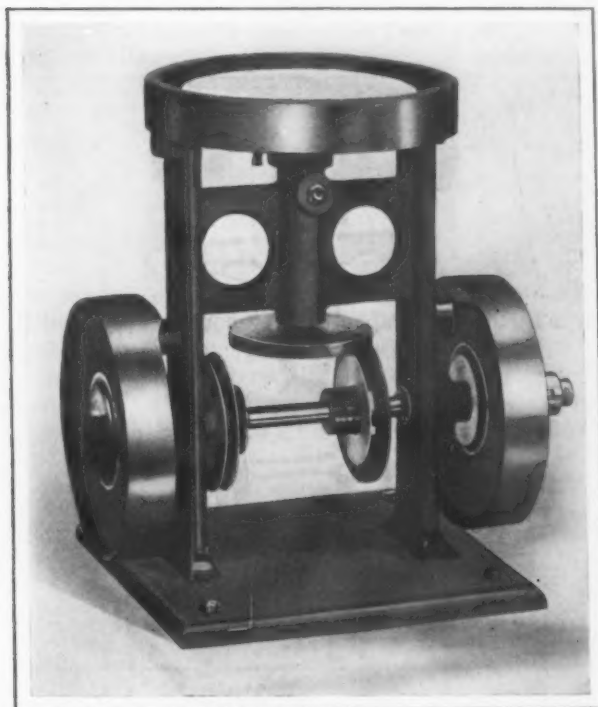
In order to stimulate the use of coke in Germany the Government is reported to have led the way by mixing certain proportions of coke with other fuel on its railroads and in its buildings, and manufacturers are following the example. This step has been inspired by the greatly increased importance of the by-products of coke ovens and gas works since the war started. The important by-products are explosive material, motor fuel and nitrogenous fertilizer. Increased demand for coke is expected to stimulate the output of these. According to the weekly report on conditions in Germany during the war, published in Berlin by the American Association of Commerce and Trade, methods have been devised to get the desired horsepower from the mixed fuel.

The coke production of Germany was 27,324,712 tons in 1914, contrasted with 32,167,716 tons in 1913. The production of pit coal in 1914 was 161,535,224 metric tons, as compared with 191,511,154 tons in 1913. That of lignite or brown coal was 83,946,906 tons in 1914 and 87,116,343 tons in 1913.

At the annual meeting of the Cleveland Engineering Society, Cleveland, Ohio, May 11, W. B. Hanlon, consulting engineer, was elected president and F. W. Ballard, city commissioner of light and heat, vice-president. Robert I. Clegg, J. E. A. Moore and W. J. Watson were elected as new directors.

A Metallographic Grinding and Polishing Machine

A machine for the quick grinding and polishing of metallographic specimens is produced by Eimer & Amend, New York, for the designer, Henry Wysor, professor of metallurgy, Lafayette College, Easton, Pa. It is really two machines in one. A one-piece casting forms the base and frame on



The New Wysor Metallographic Grinding and Polishing Machine

which all the parts are mounted. The grinding is accomplished by means of carborundum wheels, of which there are three carried on a horizontal shaft. The roughing wheel is on one end and the medium and finishing wheels on the other end. The polishing discs are of brass and are carried on a vertical spindle which is revolved by contact with a friction wheel on the main shaft. The discs are held in position by a central hub and slot device which permits easy replacement. The spindle is disengaged from contact with the friction wheel by means of a cam. The speed at which the polishing

discs are revolved may be varied by shifting the friction wheel on the shaft. The disc on which the specimen is first polished, after the grinding, is covered with canvas and the powder used is emery flour. Broadcloth covers the second disc on which tripoli powder is used. The third one, for finishing the specimen, is covered with broadcloth and jeweler's rouge is used. Separate cases are provided for holding the tripoli and rouge discs when not in use, insuring freedom from grit. The cast-iron shield affords protection from flying particles. The grinding surfaces of the machine are practically permanent and the manipulation of the polishing discs insures them against dirt contamination.

Spring Forming and Hardening Machine

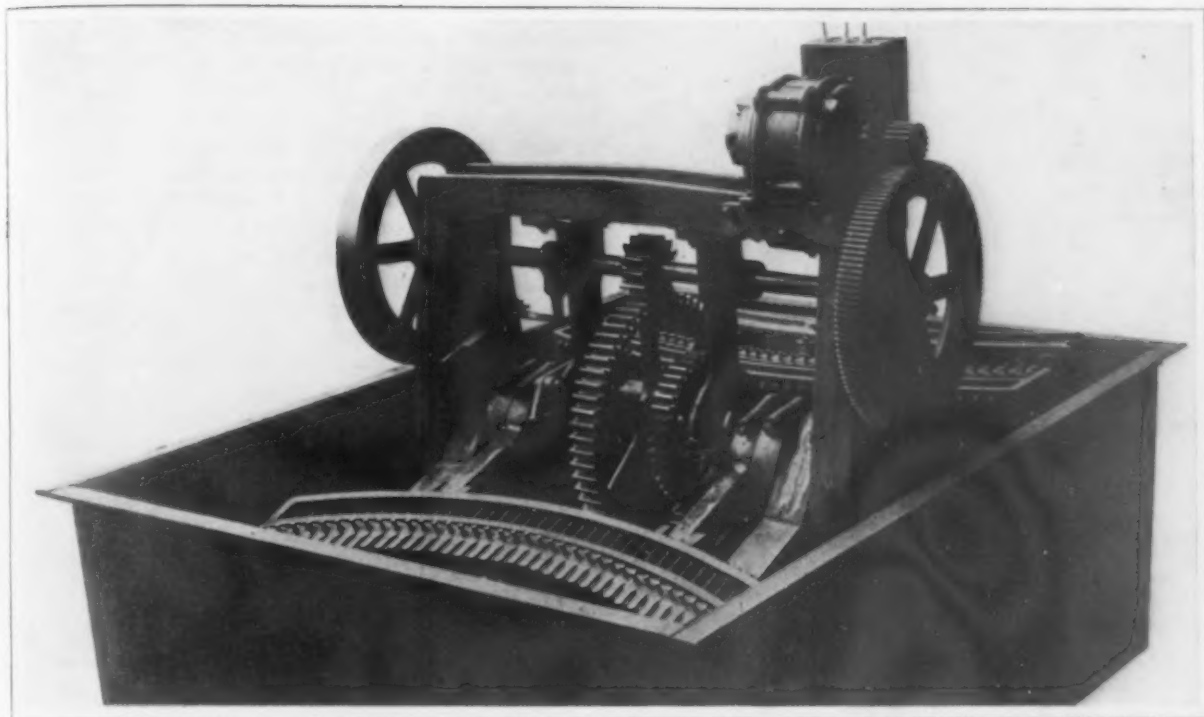
New developments in the manufacture of steel springs for vehicles have come very slowly, despite the tremendous demand which has arisen with the growth of the motor car and truck. Until very recently springs were generally formed and quenched entirely by hand, and even now the introduction of machine forming leaves a large proportion of the springs manufactured the product of manual processes. The Harvey Spring Company, Racine, Wis., has developed and installed in its plant an interesting device for automatically forming the spring leaves and quenching the spring in oil, effecting a great reduction in time and labor as well as securing uniformity in the product.

The older methods of forming the spring leaves from the plate are well known, but, by way of contrast, attention is called to the illustration which shows the hand method of bending the hot spring plate to a form by the use of tongs, requiring an expert spring maker and a helper. A nearer view of the new type of machine set up in the tank which also provides the oil bath is presented in another of the engravings. One expert spring maker can attend to an entire battery of these machines and all that is required is an ordinary laborer to transfer the heated plates from the furnace to the automatic former of the machine and remove the hardened spring when it is cooled.

The machine consists of two similar, forming keyboards one at each side of a central bearing on which the rigid frame carrying the two keyboards is pivoted so that when one keyboard is up above the surface of the oil and exposed, the other keyboard is submerged in the oil, the keyboards oscil-



A Battery of Three Spring Forming and Quenching Machines with the Heating Furnaces at the Right



A Nearer View of the Machine Set Up in the Oil Bath Tank

lating alternately. The keys in the keyboard are first adjusted by screws to a templet, in which position they are secured by set-screws. As indicated, the operation of the machine is secured through an electric motor arranged with geared drive to the main shaft, on which is a clutch con-

2½-in. springs, 50 in. long. By these machines alone was this order brought within the capacity of the plant. With the solution of the problem of maintaining a low temperature in the oil bath, it is expected that the oscillations of the quenching device will be timed and fixed, and thus a pace set for the man transferring the heated plates from the furnace and a fixed capacity established in conformity with the highest possible efficiency.

Frederick W. Taylor Co-operators

The Frederick W. Taylor Co-operators is the name under which a number of engineers and manufacturers have associated themselves for the continuation and extension of the Taylor system of management, for answering correspondence concerning the system which comes from all parts of the world, and for gathering material for the use of Mr. Taylor's biographer. Announcement of this purpose is signed by Carl G. Barth, Morris L. Cooke, James Mapes Dodge and H. K. Hathaway, of Philadelphia. Communications giving data for a memorial to Mr. Taylor and relating in any way to the work referred to above should be addressed to Miss Frances Mitchell, secretary, Box 15, Highland Station, Chestnut Hill, Philadelphia.



The Hand Method of Forming Springs

trolled by a tripping lever within easy reach of the man fitting the springs to the machine. When thrown into gear the rotation of the shaft lowers one keyboard into the oil and simultaneously, by eccentrics on the shaft, the forming keys are brought together, shaping the spring. The opposite keyboard emerges and releases the hardened spring. The time interval involved from the time of taking the heated plate from the furnace until it is plunged into the oil is 8 sec. The output from such a machine is at least four times what can be obtained through forming the springs by hand.

The Harvey Spring Company, recently called upon to furnish a large order of truck springs on a war order, turned out 25 sets daily of 12-leaf

The Stevens Institute of Technology, Hoboken, N. J., announced April 30 that \$1,385,000 had been raised for the purchase of additional ground and buildings and for increased endowment necessary to provide for the growth of the college. The money was raised through efforts of President Humphreys and a general committee from the alumni of the Institute. Walter Kidde, trustee, had charge of the campaign and secured the co-operation of about 200 other alumni. The subscribers to the fund were situated in all sections of the world, many being reached through the branch organizations of the Stevens alumni in the larger industrial centers of the United States, Europe and England.

The Ross Gear & Tool Company, Lafayette, Ind., has established a profit-sharing plan for its employees. The company manufactures steering gears for automobiles and motor trucks and is now working night and day shifts. It has adopted as a unit for the dividends a steering gear of average size. The new system resulted in a 4 per cent. distribution on the wages of employees for April, while the May dividend promises to be much larger.

A NOVEL MOLDING MACHINE

Power Squeezer of Simple Design Involving the Use of a Brass Cylinder

The adaptation of a number of devices, familiarly known in other connections, to the design of a molding machine, has led to the development of the novel power-squeezer type machine shown in



A Squeezer Type Molding Machine Having a Cylinder of Brass with Cast-Iron Ends

the accompanying illustration. The essential novelty of the machine lies in the use of a brass cylinder, in the manner of controlling the piston stroke by throttling the air in the cylinder and in the ease with which the machine can be assembled or knocked down.

The cylinder consists simply of a brass shell and cast-iron heads, the whole held together with tiebolts. The stuffing box is fitted with a simple leather packing disk. The cylinder is centered over an air inlet provided through the lower cross-brace of the frame and is locked in position when the upright guide rods of the table, passing through slots in the cylinder head, are lowered into the frame. It is thus apparent that lifting the table out of the frame also releases the cylinder so that when disconnected from the air line it can be taken out freely. The guides in the frame for the table rods are bushed with babbitt sleeves which can be readily renewed to take up wear. The use of a brass cylinder is chiefly of advantage in preventing the rusting of machines operated only intermittently. The common delays incident to putting an idle machine into service are thus avoided as well as the deterioration due to corrosion.

Smooth action during the pressure stroke is obtained by a small opening in the upper end of the cylinder through which the air, exhausting above the piston or re-entering with the gravity return of the table, is throttled. The travel of the piston upward is controlled by the rate of egress of air through this opening and the return, correspondingly, by the ingress of air. There is always present as a result, a cushioning and dashpot effect. For the control of the air on the pressure line a simple quick-operating valve is employed. This

valve is arranged so that a slight pressure of the hand opens the intake while the release of that pressure immediately opens up the exhaust. The valve is fitted with $\frac{1}{2}$ -in. renewable Jenkins discs. In the event of air being turned on when there is no mold mounted between the squeezer plates, the possibility of damaging the machine is eliminated by virtue of the air cushion above the piston, this compression in turn effecting an automatic release of the operating pressure.

This machine is built in 24 and 30 in. sizes, these dimensions being the clearance between the side rods. The design of the machine gives a capacity equivalent to other machines of like size. The stroke of the piston is $3\frac{3}{4}$ in. Increased flexibility is made available through the use of cylinders in three sizes, 7, 8 and 10 in., the accompanying table indicating the total pressures obtainable for varying air-line pressures.

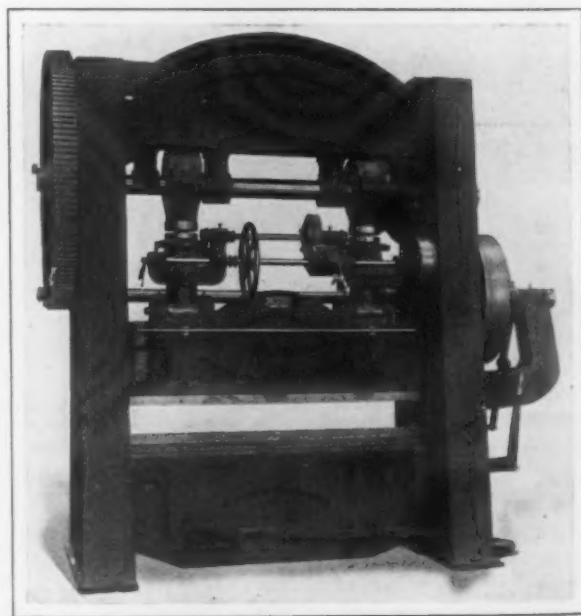
Diameter of cylinder, in.	Air pressure			
	40 lb.	60 lb.	80 lb.	100 lb.
7.....	1,431	2,146	2,862	3,578
8.....	1,886	2,839	3,773	4,717
10.....	2,986	4,479	5,972	7,466

The machine is being manufactured by the B. & B. Mfg. Company, Indianapolis, Ind., of which W. I. Ballantine is president.

A Power Bending Brake for $\frac{1}{4}$ -in. Plate

A new line of power presses or brakes has been designed and built by Bertsch & Co., Cambridge City, Ind. These machines are built in all standard sizes from 6 to 12 ft. for various capacities up to a maximum of 100 tons, the machine illustrated being intended for bending plates $\frac{1}{4}$ in. in thickness. Among the work which these brakes are designed to handle are the construction of fireproof doors, windows, partitions and trim; metal furniture, lockers and shelving; cornice and skylight work, trackage for overhead industrial trolley systems, gang punching and general bending.

The main drive is through a friction clutch, operated in conjunction with an automatic friction brake. This arrangement, it is pointed out, enables the head to be stopped at any point in the stroke instantly. Hand or power adjustment is provided for the head, the arrangement being brought out in the accompanying engraving. In the design of the machine an effort was made to



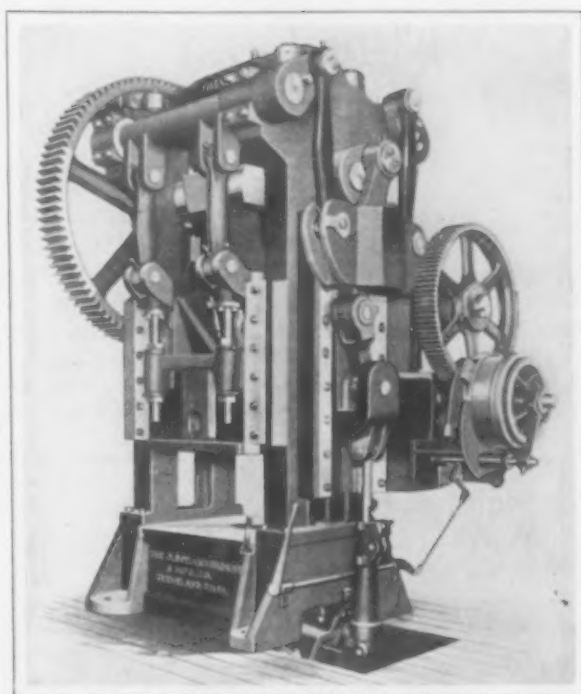
A New Power Press or Brake for Use in Plants Making Steel Doors and Building Trim, Metal Lockers and Shelving and Similar Work

provide a liberal factor of safety, and with that object in view the bearings, shafts and gears are of large proportions.

Toggle Press with Dwelling Blankholder

The Cleveland Machine & Mfg. Company, Cleveland, Ohio, has recently put on the market a toggle drawing press, the distinctive feature of which is a new mechanical movement for operating the blankholder slide. This movement gives a perfect dwell to the blankholder during more than 90 deg. of the travel of the crankshaft and is timed to release the blank shortly after the crank passes the bottom center and rise at practically the same speed as the plunger, thus giving a maximum of time to remove the stamping and place a new blank in the die and permitting a high operating speed. The accompanying drawing shows the relative travel of the plunger and blankholder slides on both the down and up strokes and the dwell of the blankholder during the drawing stroke.

The blankholder and its supports are proportioned to resist a strain equal to that exerted by the plunger during the drawing operation, and this rigidity of the holding parts and the perfect dwell on the blank, it is emphasized, permit extreme draws with a very small percentage of breakage. The machine illustrated is typical of the entire line. The frame is of tierod construction, with separate bed, arch and housings tied together with steel rods that are shrunk into position under greater strain than



A New Toggle Press Equipped with a Mechanical Movement for Operating the Blankholder Slide to Give Ample Time for Placing and Removing Work

heated in operation. The balance of this clutch is relied upon to render the use of an outboard bearing at the end of the shaft unnecessary.

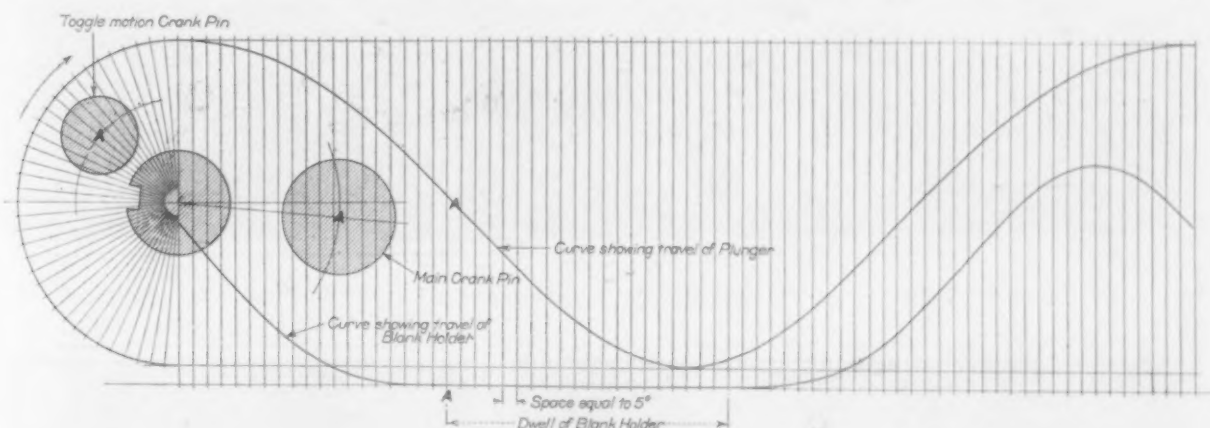


Diagram Showing the Comparative Travel of the Plunger and the Blankholder of the Press

the maximum overload capacity of the machine. The housings are tongued and grooved in bed and arch to preserve perfect alignment, under all stresses. The yokes, rockshafts, cranks, links and connections operating the blankholder slide are steel castings. The pin bearings are all bronze bushed. All the gears and pinions are of steel and have the teeth cut from the solid metal by machine. The crankshaft is made of heat treated high carbon open-hearth steel and is 9 in. in diameter in the bearings and $10\frac{1}{4}$ in. on the crank pin.

The bottom knockout is operated from the outer slide and is provided with an adjustable kick-off or trip to release the plunger when the stamping is lifted to the top of the die so that the knockout plate will drop to bottom of die and not interfere with the placing of a new blank. The plunger acts in an air chamber which cushions the return stroke.

The friction clutch is of the multiple disk type with universal adjustment of the friction disks. The brake arms and clutch disks are locked by toggle links operated by a hand lever. The friction brake ring is separated from the clutch drum and it is practically impossible for the clutch to become

The following table gives the principal dimensions and specifications of the press:

Maximum draw, in.	12½
Stroke of plunger, in.	26
Stroke of blankholder, in.	18
Distance between bed and blankholder, in.	28
Distance between bed and plunger, in.	30
Adjustment of blank holder, in.	8
Diameter of large gear, in.	98
Ratio of gearing.	45 to 1
Strokes per min.	7
Width of bed and blankholder, in.	52
Depth of bed, in.	52
Depth of blankholder, in.	48
Width of plunger, in.	40
Depth of plunger, in.	35
Net weight of machine, lb.	110,000

In addition to the machine illustrated 15 other sizes are built, with shafts ranging from $3\frac{1}{2}$ to 12 in. in diameter.

The Dodge Sales & Engineering Company, Mishawaka, Ind., has opened a new warehouse in Providence, R. I. The building is located at 171 Pine street, in the heart of the manufacturing district, and is large enough to carry a good-sized stock of Dodge transmission products. W. B. Morse, of the Boston sales staff, has been placed in charge of the Providence warehouse, which will be managed under the direction of J. T. Dickenson, district sales manager, Boston.

Flue Dust Sintering Plant at Gary

Character and Arrangement of Kilns
Proved by Experimental Work—Pro-
vision Made for Future Furnaces

Following an extended period of trial sintering with an experimental kiln, the Indiana Steel Company has completed at its Gary works an operating plant for the sintering of flue dust with capacity to treat the dust from 12 blast furnaces. Capacity is thus available for the proposed four additional blast

furnaces, the need of which has already been felt at Gary, as well as the eight present stacks. The accompanying illustrations indicate the nature and construction of the plant. It consists of two rotary kilns, slightly inclined from the horizontal, 90 ft. long and 9 ft. in diameter. As shown, each of the

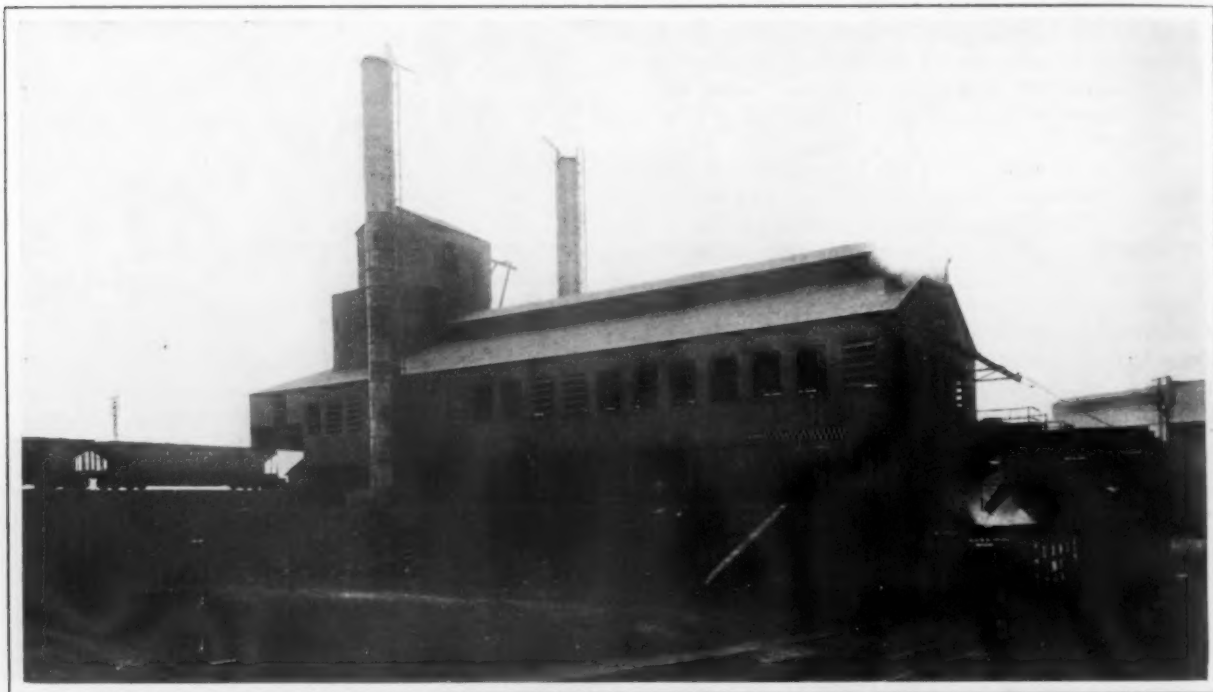


Fig. 1—Exterior of the Sintering Plant Building Showing the Agglomerates Discharging Directly into Cars at the Right

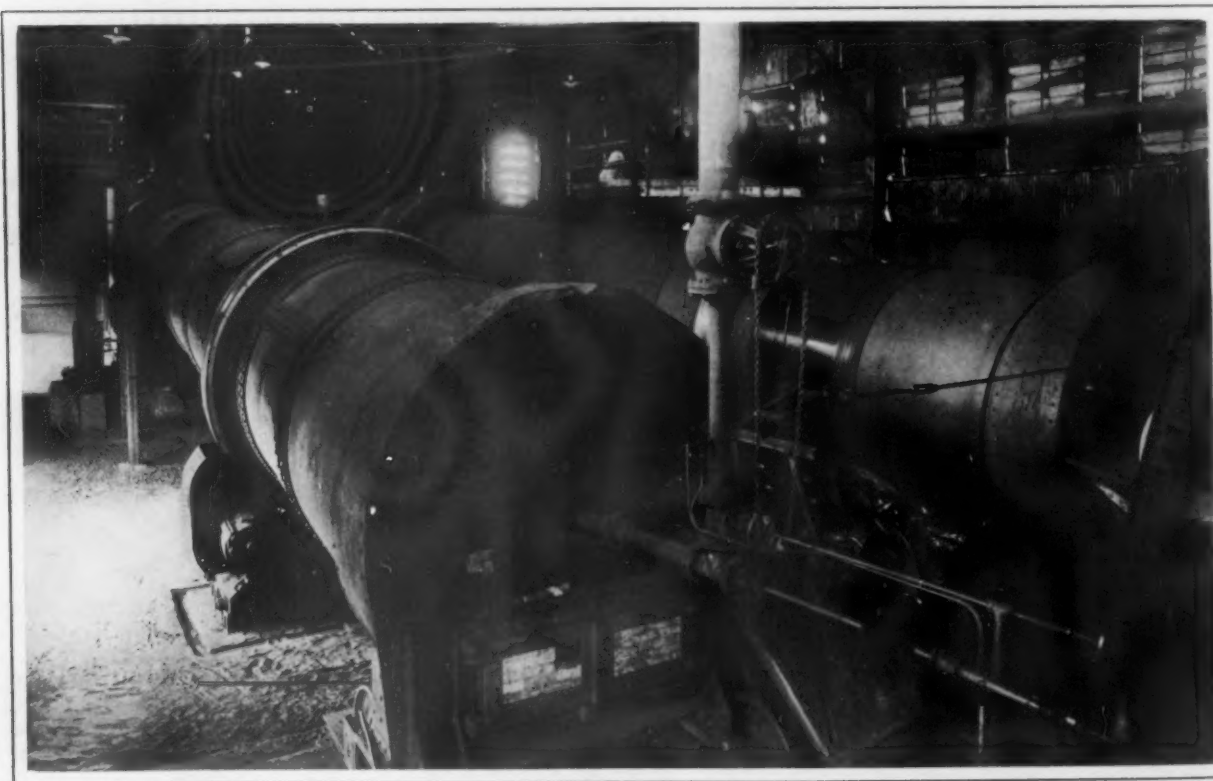


Fig. 2—View of the 90-Ft. Sintering Kilns from the Burner End Looking Toward the Dust Hoppers in the Background

kilns is fitted with two annular bearing rings and mounted on idler rollers, the bearing rings being spaced approximately 54 ft. between centers. The kilns are rotated by means of an annular gear drive, as in the line drawings from a 60-hp. motor, the motor speed of 715 r.p.m. being geared down by means of a belt drive from the motor on an elevated platform through bevel gears and the driving pinion which engages with the annular gear on the kiln. The speed is thus stepped down to give the kiln about one rotation per minute. The kilns are of heavy steel plate construction, the shell being of 11/16-in. plate with butt seams, quadruple-riveted. The kiln is lined down to give it an inside diameter of 7 ft., making the brick lining 12 in. thick.

The kilns burn gas from the coke ovens, their location immediately east of the blast furnaces and at the south end of the slip giving them a position of easy accessibility from the coke ovens. The arrangement of the burner end of the kiln is very clearly shown in Fig. 4. As will be noted, this end of the kiln is protected by a movable shield mounted on trucks so that it may be drawn back from the mouth of the kiln when not in service. The flue dust working down in the kiln toward the combustion and lower end reaches the zone of hottest gases just before discharging.

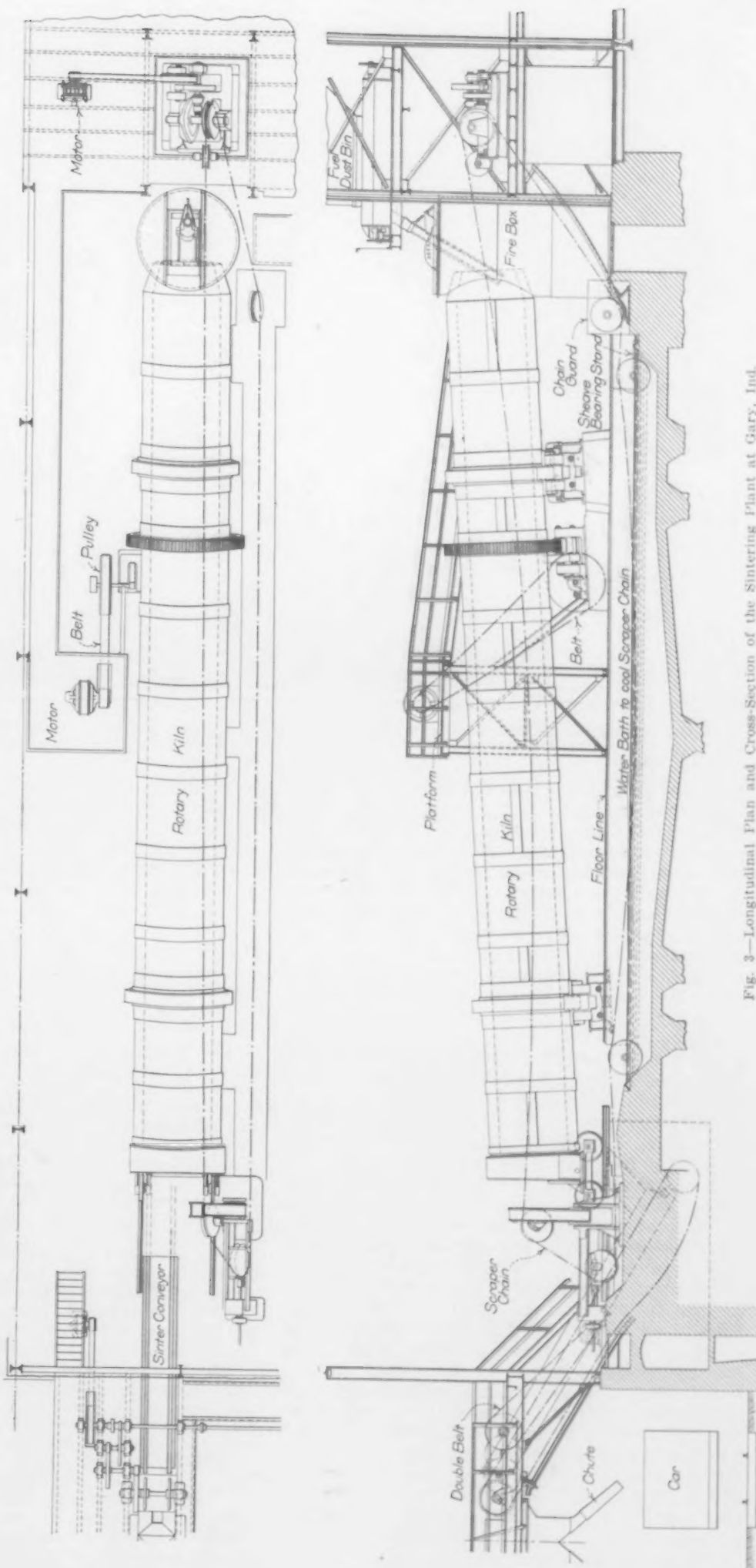


Fig. 3—Longitudinal Plan and Cross-Section of the Sintering Plant at Gary, Ind.

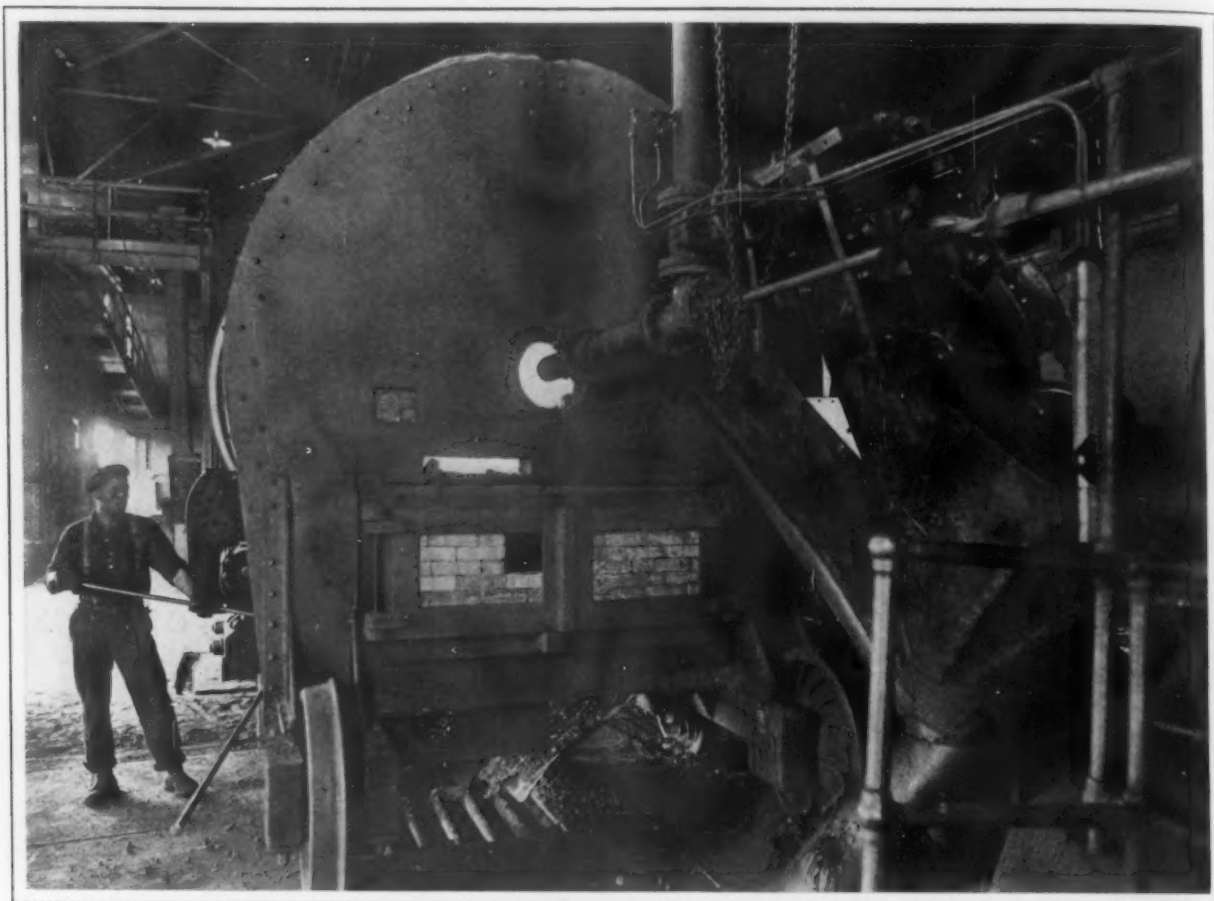


Fig. 4—Detail View of the Burner End of a Kiln Showing the Gravity Discharge of the Cinder Through the Floor Grating into the Loading Conveyors. The Drag Chain and Sprocket Are Shown at the Right

while the spent gases pass out through the smoke chamber at the upper or far end, as shown in the illustrations. The rotation of the kiln and the temperature are subject to a very flexible control being important functions of the agglomerating process.

In Figs. 2 and 4, which show the combustion end of the kilns, a view of a portion of a chain-cleaning arrangement may be seen. A drag-scraper chain passes entirely through the kiln from end to end and over a motor-driven sprocket, as shown, returning below the kilns through a water-cooling bath. By this means the clinker, as it tends to stick and hang in the kiln, is loosened and kept moving forward as it forms, the chain having an approximate speed of 70 ft. per min. These illustrations also indicate the manner in which the clinker is discharged, when the combustion hood is drawn back, being diverted by means of spouts through grizzlies in the floor to a conveyor below.

The arrangement of the sintering plant provides for a very convenient and entirely mechanical handling of materials. The flue dust, discharged from the dust catchers through foot valves directly into hopper bottom gondolas, is brought to the sintering plant, as indicated in Fig. 1, and is dumped by gravity into steel and concrete track hoppers. From these hoppers the dust moves through screw conveyors to a bucket elevator which carries it up into the overhead hopper at one end of the kiln house. Thence, by gravity, the dust passes through a revolving screen of 1-in. mesh into either one of two cylindrical bins, in each of which about 230 tons may be stored, as the operation of the plant may temporarily require. From these steel storage bins another motor-driven screw conveyor feeds the dust directly into the kiln, the speed of these conveyors being possible of very close control.

The sinter, discharged from the kiln through the

floor grating, drops on an inclined conveyor which elevates it into hoppers immediately above the loading tracks. From these hoppers, which are made with two delivery spouts, the sinter may be discharged into cars on two tracks, so that four cars may be located at one time for the loading of the sinter. A water spray is arranged in connection with these discharge spouts to provide for cooling the sinter as it drops into the cars, as appears in the accompanying views.

British Pig Iron and Ferromanganese in 1914

The British pig-iron output in 1914, according to the British Iron Trade Association, was 9,005,898 gross tons, compared with 10,481,917 tons in 1913, a decrease of 1,476,019 tons, or 14.2 per cent. The 1912 output was 8,889,124 tons. The figures for 1914 include 3,430,448 tons of forge and foundry iron, 3,235,403 tons of Bessemer hematite, 2,003,693 tons of basic iron and 336,354 tons of spiegeleisen, ferromanganese, etc. The Northeast coast is the largest producing district, being credited with 3,313,227 tons in 1914. Cumberland and Lancashire come next.

The production of ferromanganese and spiegeleisen in 1914 was only 19,035 tons less than in 1913, when it was 355,389 tons. In 1912 it was only 277,240 tons. The 1914 output was the largest since 1905, except that of 1913.

The Hyman-Michaels Company, Peoples Gas Building, Chicago, has established an office and extensive scrap-iron yard and warehouse in St. Louis at the corner of Bulwer and Adelaide avenues. The facilities are adequate to handle a large volume of business and the yards have been very completely equipped for the handling of scrap iron and relaying rails. H. J. Kiener, who has been engaged in this line of business in St. Louis for many years, has charge of the office, and L. F. Kramer, previously associated with the company at Chicago, has charge of the operating department.

An Ingot Mold with a Vacuum Chamber

A new type of ingot mold is covered by patents (U. S. 1,139,219 and 1,139,284—May 11, 1915) granted to Joseph I. Peyton and Samuel E. Hitt. Mr. Peyton was formerly Bessemer superintendent of the Dominion Iron & Steel Company, Sydney, N. S. Its outstanding feature is the incorporation of a vacuum chamber near the top to act as a heat insulator so as to retard the cooling of the upper part of the steel ingot, thus minimizing the defects due to pipes, blow holes, cavities and segregation.

One of several designs of the mold is shown in the illustration. Fig. 1 is an open-top ingot, *a*, having heat insulating chambers, *b*, so spaced as to form a relatively thick upper wall for the chambers. The upper portions of the side walls of the mold are thickened to provide heavy outer and lower walls for the chambers. The webs or partitions, *c*, between the chambers are provided with apertures, *d*, for free communication between the chambers. A valved outlet or connection, *e*, located under the stripping ears of the mold, provides a

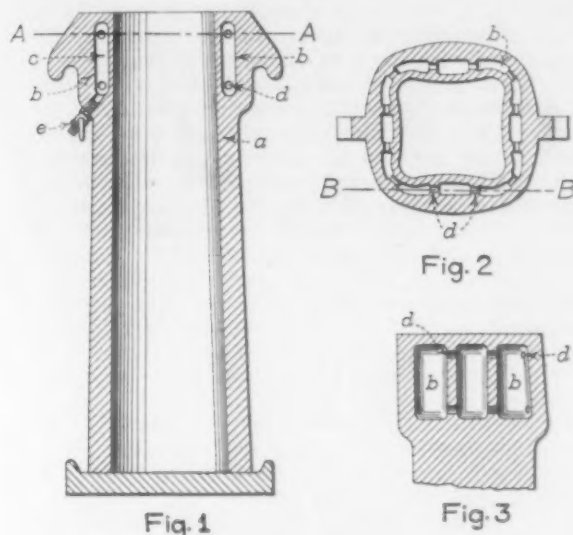


Fig. 1

The Peyton-Hitt Ingot Mold with Vacuum Chamber

place to connect an air pump for exhausting the air from the chambers. Fig. 2 is a section of the mold on the line A—A, and Fig. 3 a section on the line B—B.

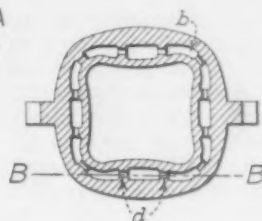


Fig. 2

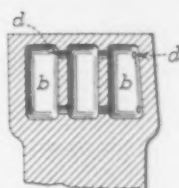


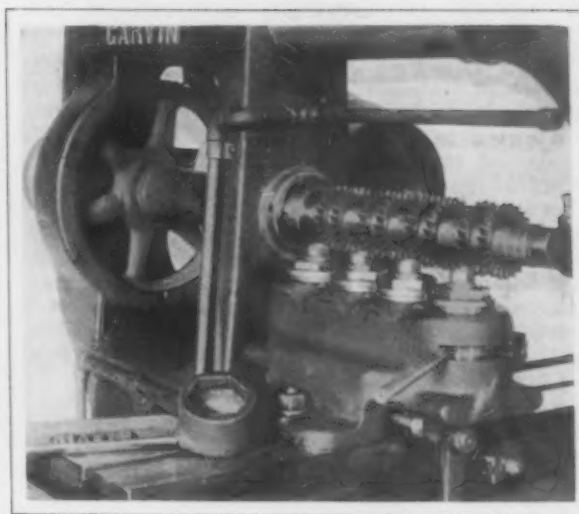
Fig. 3

Four-Spindle Milling Attachment

The Garvin Machine Company, Spring and Varick streets, New York City, has recently added a four-spindle vertical, square-hexagon milling machine attachment to its line of multiple-spindle index centers. This attachment is designed to handle work such as the squaring of screw or bolt heads, the forming of hexagons on spark plug nuts and all work of a similar nature that can be handled in collets, having a capacity of 1½ in.

The attachment can be arranged for holding the work either by double-taper contraction collets, which are operated by a wrench or on threaded arbors of plugs, the pieces being run up tightly against the hardened steel washers or collets by a special Shaw wrench. This wrench is also used for taking off the finished work, and its use is relied upon to eliminate any marring of the work.

The four spindles which are spaced 3 in. on centers are geared together. This arrangement enables them to be turned simultaneously to index for square or hexagon work. After the work has



A Four-Spindle Vertical Square-Hexagon Attachment for Milling Machines Where the Work Is Held by Double-Contraction Collets Operated by a Wrench

been finished the collets are unclamped and the work is ejected by the vertical lever shown below the attachment in the accompanying illustration.

Electric Steel from the Stobie Furnace

Before a recent meeting of the Cleveland (England) Institution of Engineers, Victor Stobie read a paper on "The Manufacture of Electric Steels in the Stobie Electric Steel Furnace." In part he said:

The Stobie furnace, used in connection with the basic open-hearth furnace, promotes the production of steels higher in quality than acid open-hearth steel at a lower cost price than the latter. For example, molten steel of a very ordinary quality from a basic open-hearth furnace, treated in an electric furnace, can be made equal in composition to acid steel made from the finest Swedish material, sounder than the latter, and affording a greater yield from the ingot. The cost price would not be increased by more than \$2.31 per ton, arrived at as follows, based on a 10-ton charge taken from a basic open-hearth furnace and poured into a Stobie furnace:

200 units per ton, 10 tons, 6c. per unit.....	\$12.16
Electrodes at 49c. per ton.....	4.86
Total labor on furnace.....	1.22
Slag materials	1.22
Repairs	2.43
Interest and depreciation at 15 per cent.....	1.22
Total per 10 tons.....	\$23.11

Yields regularly of 93 to 94 per cent. of sound billets from ingots of carbon steel had been obtained, Mr. Stobie said, the remainder representing roughly 2 per cent. furnace loss and 4 per cent. scrap. If the extra yield of sound material represented a 10 per cent. improvement on some existing practice, the saving might be taken as approximately \$1.95 per ton. This saving must be deducted from the extra cost of electrically heating the open-hearth steel in the Stobie furnace, giving a net extra cost of 36c. per ton for the finished electric steel billets.

To suggest increasing the price of rails, plates and angles by \$1.95 per ton is useless, said Mr. Stobie; but it was for the higher grades of steel, not the unfortunate subjects of market fluctuations, that the electric steel furnace was brought into existence—grades for which there is a considerable demand.

In answer to questions Mr. Stobie said that the cost for actual manufacture was \$15.27, which he would be glad to demonstrate as actual. As to the wear on roof and walls, it is certainly high, but against that the size of a 10-ton electric furnace is so small compared with a 10-ton open-hearth that it about balances the cost of repairs in the latter. Regarding the conversion of pig iron into steel, he would take the molten iron, send it through a Bessemer converter and from there directly to the electric furnace.

The Extent of German Control of the French Steel Industry

A German statement of the extent to which Germany controls the Belgian and French steel industries was published in *The Iron Age* of March 18, 1915, based on the investigations of Dr. Emil Schroedter, secretary of the Association of German Iron Masters. The London Ironmonger prints in a recent issue information, from what it regards as an authoritative source connected with the Continental steel industry, which changes the figures of Dr. Schroedter. The latter had said that Germany controls 68.8 per cent. of the total coal output of France, 78.3 per cent. of the coke, 90 per cent. of the iron ore, 85.7 per cent. of the pig iron and 76 per cent. of the raw materials.

The informant states that he has been able to convince himself that Dr. Schroedter is in error, though he adds that it is only fair to say that the stoppage of the supplies of ores from the important basins of Briey and Longwy, now in German hands, to a certain extent deprives the French metallurgical works of regularly feeding such of their blast furnaces as are not in occupied territory. On the other hand, it is known that several of them have succeeded in obtaining supplies from other quarters.

As to coal: Of a total of 40,922,000 tons produced in 1913, 19,463,309 tons came from territory now under German control, and 21,548,691 tons from mines still in French control. The enemy, therefore, says the article referred to, controls only 48 per cent., and not 68.8 per cent. of the French output.

The output of pig iron in France in 1913 was estimated at 5,300,000 metric tons. The blast furnaces in the Nord and Ardennes, producing about 675,000 tons, are at present entirely under German control. In the department of Meurthe-et-Moselle 56 furnaces are within the German lines and 23 in French territory. Of the total blast furnaces in France on January 31, 1915, 74 were estimated as being in the invaded territory and 87 in French territory. To sum up, the position of the French pig-iron industry is as follows:

		Tons
Under German control...	Nord	650,000
	Ardennes	25,000
	Meurthe-et-Moselle	2,283,300
	Total	2,958,300
Under French control....	Meurthe-et-Moselle	1,141,700
	Other departments.....	1,200,000
	Total	2,341,700

The authority cited concludes, therefore, that 55 per cent. of the total pig-iron output and not 85.7 per cent. is at present subject to German control.

German Steel Trade Conditions in April

The statement of the German Steel Works Union, issued after its regular meeting on April 28, 1915, gives the following general review of the condition of the German steel trade:

In semi-finished materials the domestic demand continues satisfactory and it is reasonable to expect that it will continue at the present high level for the immediate future. In structural steel the supplementary needs of the Prussian state railroads for permanent way material, rails and sleepers for the fiscal year 1915 have been ordered and allotted to the works, and also the additional needs for track fastenings. The entire requirements of these lines now exceed those of a year ago. Further orders from neutral countries continue to appear. Orders for grooved rails are small and business continues quiet. Domestic orders for mine rails have increased. Export business is quiet. In shapes business in March was in excess of February and specifications also increased. At the beginning of the second quarter business however was dull. In general the aspect of the domestic as well as the export demand has changed but little.

The Industrial Works, Bay City, Mich., has established as its Pacific coast agents N. B. Livermore & Co., San Francisco and Los Angeles, and the Northwestern Equipment Company, Seattle and Portland.

Chattanooga Superintendents Meet

The Chattanooga Manufacturers' Association, Chattanooga, Tenn., maintains a superintendents' division. Secretary O. L. Bunn, of the association, says that this department is the best thing the association ever started. The division is about two years old and was begun in an experimental way, but has now so thoroughly demonstrated its usefulness that it is practically compulsory for superintendents of factories connected with the association to join it. The department has its own officers and separate meetings, but each company pays the small initiation fee for its superintendent and also meets its proportion of the incidental expenses.

The superintendents discuss questions pertaining to shops, selected in advance or brought up at the meetings. At first local speakers were engaged to make talks on practical subjects, but, as the division grew and its success became assured, this plan was enlarged so that for some time nearly every meeting has been addressed by some expert from the outside. A concrete example of the benefits arising from discussion of conditions existing in the factories is taken from the proceedings of a recent meeting. A certain superintendent told of a new machine he had just installed, and gave details of the economy and efficiency derived. When he finished another superintendent stated he had had a similar machine for some time, but that he got twice the efficiency reported by the other superintendent. That naturally led the first speaker to inquire how, and in the cross fire of questions and answers probably everybody profited—certainly the first man did. As a result he found just where his mistakes were and was enabled to go back to his factory a better superintendent, with knowledge necessary to increase the efficiency of the machine of which he was so proud.

The safety first committee is proving a valuable adjunct of the superintendents' division. This committee visits one or more factories a few days before the regular meetings, and its findings are then discussed. The committee makes recommendations as to changes which should be adopted in order to render the operation of the plant more safe. As a rule, it is stated, these recommendations are put into effect. The shop visiting committee investigates and reports on sanitation and, with the co-operation of the factory owners, has effected valuable improvements. A question box is kept in the Manufacturers' Association building for the superintendents' division. Queries placed in this box are discussed at the first subsequent meeting of the division.

The secretary of the division is C. E. Jones, who is a member of the regular staff of the Manufacturers' Association, and to whose interest and faithful co-operation much of the division's success is ascribed.

Baltimore Reaching Out for Industries

For the purpose of attracting industries to Baltimore, Md., the Industrial Corporation of Baltimore City has been incorporated by prominent business men with a capital stock of \$500,000. John R. Bland has been elected temporary president and Eugene Levering treasurer. The members of the Executive Committee are Waldo Newcomer, Howard Bruce, Frank N. Hoen, Rufus N. Gibbs, Walter B. Brooks, Mr. Levering, Frank A. Furst, John T. Stone, Charles M. Cohn, Frederick W. Wood, Jacob Epstein and Mr. Bland. Douglas H. Gordon, Mr. Levering, Mayor James H. Preston, Mr. Epstein, Mr. Stone and George M. Shriver have been elected vice-presidents. It is said several applications for loans already have been received.

A plan for the establishment of an exclusively technical high school as part of the city of Milwaukee's educational system has been completed by Milton C. Potter, superintendent of schools, and Charles F. Perry, supervisor of industrial education. The board of school directors has taken steps looking to the immediate establishment of the institution. The academic work is to consist of a course in English, sciences and mathematics. Practical work is to be done in Milwaukee shops and factories.

Machine-Tool Builders' Spring Meeting

Successful Gathering at Atlantic City—Chief Problems
Now Are Increasing Production and Making Deliveries
—Foreign Trade a Subject of Executive Consideration

The thirteenth semi-annual convention of the National Machine Tool Builders' Association, held at Atlantic City, N. J., May 20 and 21, was in every way a successful and profitable gathering. There had been some fear that the pressure of business now bearing on perhaps a majority of the members of the association would operate to keep them at home, but a satisfactory representation was on hand and what was lacking in numbers was made up in earnestness and diligence in attending the sessions. The officers of the association expressed themselves as gratified with the results obtained. Over 75 persons were registered and probably 100 or more were present. The headquarters were in the Marlborough-Blenheim.

Never before has there been a convention where a similar atmosphere obtained. There was no anxious talk of shops running on part time, or of how to get business, for most of the members have more orders than they can fill in months. How to meet, to the greatest possible extent, the deliveries now demanded was the dominant question with nearly every member. At the annual meeting in October, 1914, General Manager C. E. Hildreth said in his address: "We have passed through the most strenuous period in our history, but the reward is bound to be just as strenuously glorious. . . . You surely are all convinced that the demand for the last six or eight years seemed to have gotten lost, but, unless all signs fail, it is going to take a tremendous supply to satisfy its rapacious maw when it reappears." It is needless to say how prophetic the words have proved to be.

TOPICS DISCUSSED OFFICIALLY OR OTHERWISE

Of course there were problems and questions of a disquieting character, but they were not the ordinary ones debated year after year. Some were discussed in executive sessions which took on unusual importance at this convention, while others were talked over in the corridors of the hotel. One of these was a fear that small or possibly ill-advised manufacturing concerns might undertake the production of lathes or other standard machine tools because of the present demand. It was pointed out that, while the makers of lathes at the present time are taxed to their capacity and still cannot meet the demand, their facilities are more than ample for normal times and that only disaster can come to those who are tempted into the business by present conditions. In the eventual struggle for existence which the interlopers probably would make, the trade would be upset and all would suffer. The present peak of demand may never come again. Rather than being inadequate in normal busy times, the productive capacity of machine-tool makers is great enough to foster the keenest competition. In slow times, such as prevailed up to a few months ago, the carrying of overhead expenses and the strain of holding organizations together, as well as keeping abreast of progress in designs and methods, are most serious problems. The question arises as to the fate of a concern which would organize and equip itself to enter a business under temporary abnormal pressure.

Another problem at least informally discussed was that of the growing scarcity of skilled mechanics and machinists. The entrance into the war munition field by some of the largest manufacturers, who have bought every machine their purchasing agents can lay their hands on, means a tremendous increase in the need of skilled labor.

Foreign business and its ramifications, including the question of representation abroad, was another topic discussed. At the convention were representa-

tives of foreign houses who have heretofore had a large part in selling American machine tools in Europe.

CONFERENCE ON APPRENTICE TRAINING APPROVED

The first session was called to order, Thursday morning, by President W. A. Viall, Brown & Sharpe Mfg. Company, Providence, R. I., who, after his introductory remarks and other preliminaries, surrendered the chair to First Vice-President J. B. Doan, American Tool Works Company. Mr. Viall then said that most of the members were familiar with the work done by the board of safety and sanitation, made up of three members from each of four industrial associations, and that an effort would be made to apply the same system to the apprenticeship question in which the National Machine Tool Builders' Association already had done good work in devising indenture and other papers. He believed that the tool builders should co-operate with other associations, particularly in view of the fact that M. W. Alexander, General Electric Company, Lynn, Mass., felt that good results can be obtained from a conference board on the training of apprentices. In March Mr. Alexander suggested a conference between representatives of the United Typothetae, the National Association of Manufacturers, the National Founders' Association, the National Metal Trades Association and the National Machine Tool Builders' Association. Mr. Viall said that the United Typothetae had expended thousands of dollars in elaborating a system for training apprentices and he believed that whatever tangible suggestions could be drawn from the work should be appropriated by the machine-tool builders, inasmuch as in so doing they did not bind themselves. The Executive Committee of the association had approved of the conference idea to the extent of appropriating a sum covering necessary expenses of participating. At the final session the action of this committee was ratified and the work commended and authorized as far as the association is concerned.

The question was raised as to the operation of such a conference board in the State of Wisconsin, which has an apprenticeship law. Mr. Viall replied that the board would have in mind all such laws and study them, that being one of the advantages to be obtained. Mr. Viall resumed the chair.

ASSOCIATION CREST PROPOSED

C. O. Smith, Norton Grinding Company, Worcester, Mass., reported that at the request of General Manager Charles E. Hildreth, Whitcomb-Blaisdell Machine Tool Company, Worcester, he had considered the question of a crest which members of the association might use on their letter-heads, or otherwise, and submitted the design of two gears with a pinion between, one of the gears bearing the outline of the Western Hemisphere and the other gear the seal of the association. The subject was referred to a committee of which the following were later appointed members: C. E. Hildreth, Winslow Blanchard, Blanchard Machine Company; C. O. Smith and E. C. Woolgar, National Acme Mfg. Company, Cleveland, Ohio.

For the Committee on Traffic, appointed at the previous meeting, it was reported that appearance had been made at several hearings of the Interstate Commerce Commission and it was believed that satisfactory progress had been made.

C. O. Smith, Norton Grinding Company, reported for the Association Catalogue Committee, of which S. H. Bullard, Bullard Machine Tool Company, is chairman. Mr. Smith explained that because of the war the contemplated publication by the association of a

four-volume catalogue in English, French, German and Spanish, listing the machines made by the members, had not been proceeded with. Action was deferred to January 1, 1915, and then to March 1. The committee, therefore, at the suggestion of General Manager Hildreth, turned its attention to the development of a purchasing agent's card index contained in a cabinet with two drawers. A circular distributed at the meeting, and which formed a part of the report, described the project, which is in part as follows:

THE ASSOCIATION INDEX

The index will consist of two parts: first, a subject index in which will be carefully catalogued every machine tool worthy of the name, made in America. All manufacturers of machine tools will be included, regardless of association membership, as it is the object to make this index so complete that it will become indispensable to the machine-tool buyer.

The guide tabs of this index will bear the various subject heads into which all classes of machine tools will be divided. Opposite the names of members of the National Machine Tool Builders' Association on the subject index cards will be an asterisk indicating that further detailed information regarding the product of these manufacturers may be found on cards in the manufacturer's index in the right hand drawer of the cabinet. The guide tabs of these cards will bear the name of the manufacturer, and the entire card, back and front, will be devoted to detailed data covering his product: on the front of the card the capacity, dimensions, weight, etc., and on the back of the card a line illustration of the general type of machine to which the data on the front of the card refers. Cards on both indexes will bear the date of revision.

It is planned to revise the subject index annually so that it will be always up to date. An opportunity to revise manufacturers' index cards will also be afforded members of the Association once a year.

Each subscribing member will be entitled to furnish a list of customers and prospects to whom he wishes a cabinet forwarded. These lists will be checked to avoid duplication. Five thousand cabinets complete with indexes will be distributed by prepaid express and an agreement entered into with the recipient that he will maintain the cabinet in good condition and insert new cards in it as received, either destroying or returning the old cards.

The cost of compiling the general index, "Machine Tools Made in America," a detailed membership data index, printing the necessary index cards and guides, inserting them in 5000 two-drawer cabinets bearing appropriate title plates and distributing these cabinets in the United States and Canada, will be \$100 per card in the manufacturers' index, based upon a minimum subscription of 500 cards. The cost of the annual revision will be \$45 per card.

The cabinets are to remain the property of the association and may be recalled wherever evidence is given that they are not of value to the holder. The understanding is that they are loaned to purchasing agents and others who will make use of them on condition that new cards will be inserted as issued and the index as a whole kept up to date.

The report was accepted and the committee was later authorized by resolution to proceed with the work. The report of Treasurer A. E. Newton, Reed-Prentice Company, Worcester, Mass., showed the finances of the association to be in a satisfactory condition. Conventions committees were appointed as follows:

Meeting: C. H. Alvord, Hendey Machine Company; P. J. Thomas, Kempsmith Mfg. Company, and W. E. Burdett, Diamond Machine Company.

Resolutions: A. H. Tuechter, Cincinnati Bickford Tool Company; T. C. Dill, T. C. Dill Machine Company, and A. B. Iles, International Machine Tool Company.

Press: W. A. Viall, C. E. Hildreth and Charles L. Taylor.

Robert T. Kent, editor Industrial Engineering, New York, read a paper entitled "The Application and Use of Time Study Data," given elsewhere in this issue of *The Iron Age*.

Problem of Operating a Night Force

In introducing the next speaker, Harold C. White, superintendent of assembling, Pierce-Arrow Motor Car Company, Buffalo, N. Y., Mr. Viall said that night work was a recognized evil and one which is particularly troublesome at present in view of the existing great effort to make deliveries. Mr. White's topic was "How to Profitably Operate a Night Force." In part he said:

PROBLEMS IN INCREASING PRODUCTION

"When extraordinary volume of product is desired, three principal and closely related limiting factors immediately present themselves for the consideration of the factory executive—first, time; second, labor; third, facilities. The first has a positively fixed daily limit of 24 hours and can be, and is, utilized to this limit in some instances. The second factor, labor, is limited by market conditions, and by the ability of the user to supply material and facilities to keep it profitably employed, thus presenting a problem, in the handling of which, more or less flexibility of action can be taken. The third factor, facilities, is limited only by the ability to provide them and to use them, and here again considerable flexibility of action can be taken advantage of in order to successfully meet new and unusual demands for product.

"The degree in which each of these three items is a limiting factor in securing additional production and their relative importance to each other as restricting influences are subject to determination by analysis, and just in proportion as we are successful in carrying out such an analysis, and in balancing time, labor and facilities to produce a synchronized and harmonious result, can we expect to profit by the employment of more than usual of any one or all of them. There is no profit to be gained in working additional hours per day if we greatly lower or cripple the efficiency of the workers by so doing; and likewise there is no advantage in employing workers and facilities out of balance with each other.

"The solution of the problem varies as the labor market, factory conditions, types of work and of workers, and the available supply of facilities vary, and that the solution that will apply in one case will not necessarily apply in its entirety in another. During the past nine months the labor supply has been generally plentiful, so that the simplest and probably the best thing to put the most stress upon has been the employment of more hours per day and additional men working nights, keeping the facilities employed about the same as before.

SHORTAGE OF NIGHT WORKERS PROBABLE

"If the present demand continues long this condition will change; good men will be able to obtain nearly as good day jobs as their present night jobs, and, as a consequence, the simplification of methods and the amplification of facilities will become the most important items for consideration. With the cause and the results of the present heavy demand in mind, considering among other results the immense field which has been opened up and educated to the use of American tools and appliances, the demand will be a permanent one and the amplification of American manufacturing facilities will necessarily follow. This need will take time to develop and time to supply, and in the meantime night forces must be employed.

"To secure the best results from the employment of a night force, the conditions surrounding it should receive primary attention, as the handicap of working, sleeping and eating at unusual hours is enough without having to face any other. Power, light and heat supply, distribution and segregation should be studied, and in many instances can profitably be modified to meet, and not to exceed, the needs of the night force.

"In some plants where power is steam generated and electrically distributed, it is comparatively easy to make modifications, and it is sometimes found profitable to purchase electrical power for night running, rather than to run the steam plant full capacity night and day. It pays to part line shafts, used for several departments, when only a few of the departments are operating nights, putting in small motors instead of one large one. The running of a long line shaft to take care of a few machines is frequently seen and is surely an unnecessary waste.

GOOD LIGHT AND CLEANLINESS ESSENTIAL

"Lighting, in particular, should be ample, as poor work and small quantity is sure to follow where insufficient light is provided, and in addition to this, sufficient heat and ventilation should be supplied to keep operators comfortable. Cleanliness of surround-

ings should receive especial attention. It must be kept in mind that where machines are running double the usual number of hours there is double the amount of chips and dirt produced and to be cared for, and as dirt is only secondary to lack of light as a limiting influence on the quality and quantity of work produced, this is an important point.

"Additions should be made to the stock handling and accounting crew, together with the provision of additional stock handling facilities, such as stock racks and bins, transveyor skids, trays, etc., in order that machined material will not be delayed in transit from machines to assemblers. The longer such material is in transit between these naturally separated departments the greater chance there is for damage in handling, and incidental increased labor in assembling, adding an unnecessary expense as well as delay.

"Selected subjects should be provided for night work, confining such work to those parts which cannot be produced days. If detail records of the time involved in each operation of each part are available, and also records of idle machine time during periods of usual production, the selection of the proper points whereon to apply pressure is comparatively simple. With no such records at hand, estimates of the machine time involved must be made as closely as possible and night work started upon that basis; the revision of practice proceeding as the work is carried on and one item or a group of items shows a gain on others.

METHOD OF BALANCING OPERATIONS

"A valuable aid in picking out the right subjects for pressure is a graphic chart showing the number of jobs on hand to start in each department, or on the same type of machines, the vertical lines of such charts being used to indicate quantity and the horizontal ones, time. Such charts, together with a daily statement of the total number of jobs held in each department beyond a certain number of hours, provide the factory executive with a very clear idea of the relative standing of each department, both as regards load and progress, and effectively point out where pressure is required. The posting of these charts where they can be seen and compared by department heads is an incentive to healthy competition between them, as no one likes to bring up at the end of the procession.

"Another aid and easy method of securing prompt and balanced action after work has been properly scheduled is to post at the clerk's desk in each department, on a suitable rack, envelopes containing factory orders and requisitions for material, for all work starting in that particular department; across the envelope in 3-in. figures is stamped the 'starting date' and envelopes are hung on the rack according to these dates. The work not starting on schedule is thus prominently and continuously called to the attention of all who are interested. To avoid the necessity of answering questions as to reasons for delay, colored signals indicating lack of material, lack of machines, lack of tools or lack of men may be hung with the envelope by the foreman or clerk.

"To aid in giving the proper precedence to work, after it leaves the starting department, visual indication of the relative importance of action may be given, at all stages of progress, by means of variously colored instruction cards, which accompany the work; each color representing a particular lot or balance. Detail precedence can be given to parts of the same balance, and bearing the same color card as other parts, if the scheduling has been perfected to a sufficient degree.

"In the early days of railroading, when traffic was light and trains ran slowly, instructions for running were given verbally. As traffic and speed increased, schedules were prepared, and written orders and manually controlled signals came into play. When extremely dense traffic, at speeds which were unbelievable in the early days, became common practice, scheduling became an engineering problem, and written, telegraphed and telephoned orders backed up with automatically operated visual indications were given to train operators.

"Train movements in congested terminals are visually indicated back to the operator in the remote tower as they occur, and while we have not yet brought the

movement of work in process in a machine shop quite to this degree of refinement, it is approximated by means of variously colored cards, in compartments of a suitably prepared table, being moved from a 'not started' to an 'in process' and thence to an 'in stock' compartment as the work progresses, thus giving at a glance fairly positive information as to the relative standing of parts needed for a balance.

NEED AMPLE SUPPLIES AND TOOLS

"Even with the employment of a night crew, jig, tool and fixture equipment is a very live subject when extra production is wanted. Ample and immediate supplies of this very necessary equipment should be provided, and the design and production of such appliances can be followed up in the same manner as applies to machined parts. The source of supply for this auxiliary equipment has been materially improved during the past few years and it can now usually be procured, made to drawings, as quickly and cheaply as when made by the user.

"Patterns should receive the same attention at times of pressure as tools or even more, and metal patterns or metal faced wood patterns and core boxes are frequently necessary and economical additions to equipment, where wood patterns served well enough before.

"One of the dangers incidental to night work to be guarded against, and a point, by the way, which will have a direct influence on new business after the present export rush diminishes, is the more rapid deterioration of machine-tool equipment. It must be borne in mind that machines and tools are doing double duty, and that wear and consequent misalignment and misadjustment are taking place at least twice as rapidly as usual; furthermore, at least some of the operators are temporary employees and more or less careless. Therefore, milling machine tables, drill tables, bearings, etc., should be gone over frequently and checked and trued up if necessary, so that accurate work is always possible. This precaution will remove at least one of the causes for trouble and poor workmanship, customarily laid at the door of the night force.

SELECTION OF NIGHT WORKERS

"The selection of executives and of the crew for night work has vital importance in relation to the profits derived from such work. Cases have been observed where the organization, discipline and records of a considerable sized night force were so lax that a few additional machines added to the equipment and the employment of a small portion of the best of the night men on the day shift entirely did away with the necessity of running a night force and resulted in a marked saving; so it is essential that, if a night force is to be employed at all, the selection of the men composing it be most carefully made. Here, again, good records of past performance and an intimate knowledge of the men composing the day force is of valuable assistance.

"Good results have been attained by the selection for the principal night executive of one of the best men of the secondary line of day executives. If a steady, young, ambitious man with a good record behind him and good possibilities before him can be secured, so much the better. For the leading night operators and for night foremen it is well to select some of the steadier and more reliable day men, preferably those with homes to pay for, and who consequently are willing to make some sacrifices in order to obtain the extra compensation usually offered for night work.

"Fifteen per cent. more per piece or per hour, working 60 hrs. per week of five nights has, in the main, been found satisfactory. During extremely hot weather it may be found desirable to shorten the hours somewhat, stopping work at midnight Fridays.

"Smoking allowed during the night run or preferably during a portion of the night, say, from 10 to 11 and from 1 to 3 o'clock, serves to bridge over the most trying hours. Another feature that helps toward keeping night workers satisfied is the serving of hot coffee, or a hot lunch at cost, at midnight; this affords a good reason for keeping the men in the plant throughout the night trick and keeps them away from neighboring saloons, removing a chance of losing some for half the night.

"The inspection crew should be composed of the same type of men as the leaders of the night force, and final inspection is better left to the day inspection force.

"Machines should be set up ready to run by the day workers, thus avoiding in a measure errors apt to creep in at this stage, and, where practical, long runs provided. When necessary to set up to start operations nights, drawings, tools, and any instructions practice has proved desirable should be boxed and made ready for the night men.

ASSEMBLING AT NIGHT INADVISABLE

"For assembling operations it is questionable if night forces can profitably be employed, especially where the work is of a very refined and complicated nature, as the opportunities offered for the covering up of poor workmanship, which may not be discovered until the product has been in service for some time, are too numerous. Furthermore, it is usually found that, with additional quantity of product, assembling operations can be subdivided and specialized to a degree that enables much more rapid progress on that portion of the work than is usual, with a consequently marked decrease in cost. While it is usually necessary to employ additional jigs, fixtures and small tools to accomplish this end, the increased investment is comparatively small, and such equipment pays for itself in a short time.

"It is also found profitable to specialize the care and upkeep of such appliances, at times of pressure, to a greater degree than is ordinarily the case. Where one man usually cares for the grinding of drills, reamers and small tools used by a group of assemblers, two or more may be necessary.

"In assembling work, again good records of past performance as regards time and the tools and appliances used are of great assistance in planning for increased volume, as such records allow the making of definite plans as soon as extra production is decided upon.

"Touching on the degree to which assembling operations can be simplified and specialized, an example of such work as carried on at the Ford factory may be of interest. In the driving of six or eight screws in the rear axle three men are employed; the first picks up and starts the screws, the second drives them home with a socket wrench mounted in an air motor, hung on a long spring, and the third goes over them with an open end wrench, this last operation serving as an inspection. The work is continuous, passing from one man to the other, and the operators have their tools always in hand and do not leave their tracks. Economy of labor and brain effort are reduced to a minimum and apparently more than offset the high rate paid, as compared with customary practice. While not many manufacturers have the volume of repetition work prevailing in this instance, the principle employed can profitably be used in some degree, wherever increased production takes place.

"Some of the incidental profits to be gained from the employment of a night force are the permanent simplification and improvement of design, appliances and methods which are sure to accompany and follow pressure work, as good suggestions are bound to come out at such times, and everyone is more open to receive and act upon them than usual. Executive talent, previously more or less overshadowed, is developed and proved. These gains are a permanent source of revenue.

"Space and labor requirements for a specified production receive a direct and strong illumination and old hide-bound restricting ideas as to possibilities are everlastingly smashed, thus permanently establishing and fixing a higher degree of efficiency."

Mr. White interpolated in his paper an instance of a night foreman who complained that he could not get any sleep. If he closed the windows and door of his sleeping room to keep out the noise he did not get any air. Results, he said, are largely in accord with the spirit of the organization, a sense of loyalty and pulling together, all of which cannot be acquired in a short time. With some men a "charge of dynamite" seemed almost necessary to get them tuned up.

VIEWS EXPRESSED IN DISCUSSION

R. E. Flanders, Jones & Lamson Machine Company, Springfield, Vt., said that his company's solution of the night work problem was to let the men go on at 5 p.m., immediately following the day gang, give them half an hour for lunch and let them off at 3.30 a.m. They are also supplied with hot coffee.

A. E. Newton expressed the belief that the most difficult phase of the question is securing the men willing to work at night. Mr. Viall said that it seemed to be easy to get policemen who had to work at night, but difficult to get mechanics who would do so. William Lodge, Lodge & Shipley Machine Tool Company, Cincinnati, Ohio, said his former experience had been that night gangs were not profitable, but that he had lately found a man who knew how to organize a night force and that it was now operating successfully and profitably. Mr. Viall directed attention to the greater tendency of men working at night to take colds and contract diseases, especially in the spring.

OTHER SESSIONS ON THURSDAY AND FRIDAY

The early afternoon of Thursday was devoted to group committee meetings of makers of various tools, after which the members assembled at an unscheduled executive meeting at which the problems of foreign trade were discussed. It was pronounced the most important session of the convention. The morning of Friday was devoted to committee meetings.

At the last session, held Friday afternoon, the report of the Committee on Resolutions was submitted by A. H. Tuechter. A resolution was adopted changing the constitution so as to make a retiring president of the association a member of the Executive Committee. Mr. Doan had introduced the resolution previously and had said the experience of a retiring president was too valuable to lose.

It was stated that Stanley Bullard was in a New York hospital recovering from a severe operation and that the wife of E. P. Bullard was also ill. A resolution was passed authorizing General Manager Hildreth to send letters expressing the sympathy of the members for both.

President Viall said that the report of the Committee on Grinding Wheel Standardization, R. G. Williams, acting chairman, had been made to the Grinding Machine Committee and would be presented to the convention only by title, as it will be printed in the proceedings. The report follows:

REPORT OF GRINDING WHEEL COMMITTEE

The Standardization Committee of the grinding wheel manufacturers was appointed to consider all matters bearing on standardization work in connection with grinding wheels and to prepare a report on wheel shapes, to be presented to the National Machine Tool Builders' Association, with the hope that the association will co-operate to the extent that a great many of the grinding wheel shapes now in existence can be eliminated. The benefits to the machine manufacturers as well as all other users of grinding wheels are as follows:

1. Service to users of grinding machines regarding delivery of orders for wheels: The grinding wheel manufacturer cannot carry an adequate stock of special shaped wheels. While wheels of standard shape are stocked in a large variety of grains and grades, the elimination of present special shapes will mean that a larger variety of grains and grades can be stocked in standard shapes, thus increasing the per cent. of orders filled from stock and eliminating to a large extent the month to six weeks wait now quite common.

2. Wheels of standard shape have a larger number of cubic inches available for grinding and the price of standard shapes is lower than the price of special shapes, thus costing the user materially less for each available cubic inch of wheels of standard shapes than when special shapes are demanded.

3. The manufacturer of grinding machines will have a standard code which can be used when designing new types and remodeling existing ones.

4. Only designs will be adopted as standard which are of such dimensions that the proper operating speed can be used with safety.

5. The quantity of wheels carried by the machine manufacturer to send out with machines can be materially reduced, and yet carry a quantity which will permit supplying reasonable requirements in connection with orders for grinding machines.

From the wheel manufacturers' point of view the benefits to be derived are many. The following are the most prominent: 1. Special shapes are difficult to manufacture. 2. Experience has proved that it is not good policy to stock special shapes. 3. In a great many cases it is found that a standard shape can be used as satisfactorily as a special shape if a little time and thought are given to the problem.

Wheel shapes have been classified in accordance with the types of existing machines on which they are used and are further sub-classified into the shape of the wheels, namely: Cylindrical grinding machines, internal grinding machines, knife grinding machines, etc., straight wheels, wheels countersunk one side, wheels countersunk both sides, cups and special shapes.

Separate folders have been prepared in accordance with the main classification given above, namely, the type of machine. On one side of a page appears the existing shapes, and directly opposite appears the recommendation for that shape. Wheels are listed on the following basis: First, diameter, then thickness, the smallest dimension heading the list. A reference to one of the folders will readily make clear the classification used.

In connection with recommended sizes for holes in wheels, the requirements given in the safety code have been taken for wheels used on bench stands, floor stands, swing frames and other machines of this class.

Paper on Drop Forging

General Manager Hildreth read a paper by A. M. Tilton, president Drop Forging Company of New York, Jersey City, N. J. It was in part as follows:

"Hammering or forging hot bars of metal into shapes is among the oldest of the crafts. The work for hundreds of years was entirely performed by hand and though a marvelous degree of skill was acquired there appears to have been but slight if any change in methods; indeed, most of them are still in force where hand work alone is required.

"A departure from the old ways naturally could not occur until the need demanded it and a means for satisfying it appeared. These came in the middle of the last century when the swage of the blacksmith was developed into a form of forging die and the early type of drop hammer was devised. The history of the drop forging industry lies well within this period of about 75 years, though by far the greatest improvements both in the machinery and practices have been made in the last 25 years.

"The making of forging dies is almost as much of an art as it is a trade. Except for merely elementary features no fixed rules can be laid down for doing it.

"In the early days of the industry there were but few mechanics, however well skilled otherwise, who could make drop forging dies successfully without a considerable period of actual practice in the work. This condition operated somewhat to retard the development for a number of years.

DIES NEED INDIVIDUAL ATTENTION

"The making of the dies is a feature of first importance in the production of drop forgings. Each design or piece has to be given individual attention in the construction, to promote ease of operation, the free motion in the metal while forging, and accuracy in forms and dimensions.

"To permit the easy removal of the forgings from the dies a draft of seven degrees is usually allowed on the sides or vertical dimensions, although in some shapes this may be more or less than seven degrees. Ordinarily, this draft is added, but where the forging is not to be finished to any particular dimension, or if the metal could be spared at that point, it is sometimes taken off. The allowance for shrinking is usually $3/16$ in. to the foot, but practices vary in different shops.

"For economical reasons dies are sometimes made with only a single forging impression, which reduces the first cost of the tools to a moderate extent, but the forcing of the hot metal into its final shape without any preliminary operation may sometimes result most unsatisfactorily since it is liable to create or add to any strains that may have existed in the bar, and thereby establish a center for crystallization when the forgings are in use.

NUMBER OF IMPRESSIONS REQUIRED

"By making the dies with at least two impressions,

one being merely auxiliary to partially shape the piece and having the corners, if any, well rounded to permit a gentle motion of the metal in the dies, and the other to give the final shape to the piece, the liability of any additional strains is diminished and furthermore the life of the dies increased. For the making of plainer pieces one set of dies is usually sufficient, but in many of the more complicated forms, such as crankshafts having three or more throws set at other than straight angles, two or more sets of dies are required, one for each separate operation. Frequently the intermediate operations may be performed in the press, which is normally an auxiliary of the drop hammer, or it may be desirable to resort to first principles and require the assistance of the blacksmith, who is yet and probably always will be a very important factor in the working of wrought metals.

"The variety of shapes which it is possible to make by this process is almost unlimited, although some would require so many operations as to make the cost prohibitive. Where such are required, however, in considerably large quantities, this difficulty may be overcome in a measure even though three or more operations may be required to produce them. Very thin pieces or those that are thin with heavier sections at intervals are among the difficult shapes to produce because of the rapid cooling of the thin parts in the dies, which prevent the reduction to size without reheating. Such pieces would therefore be more expensive than those of equal weight, but more regular in outline and of greater thickness. By far the greater number of shapes in drop forgings are such thickness and general proportion as to be quite easily handled and those just mentioned would perhaps be more properly regarded as exceptional.

VARIATIONS IN HEAT AND RESULTS

"As nearly as possible it is desirable to make steel forgings at a uniform temperature, which is about 1800 deg., except for tool steel, where it should be much lower at the beginning of the operation, but as the blows or strokes of the hammer are not ordinarily sufficiently rapid to maintain the heat the finishing stroke is made at a slightly lower temperature, and as this temperature varies at the finish so will the shrinkage in the cooling process of the forging also vary, the allowance for this in the dies being constant. A further variation may be expected occasionally to a small extent, though hardly perceptible, in the matching of the dies, which, however accurately set in the hammer, will vary slightly in the fall due to the necessary play in the hammer head between the ways. These are almost negligible, but are to be considered in the construction of jigs and fixtures for the finishing work.

"Where uniformity of contour is essential, it is customary to overcome this by re-striking the forgings after the trimming operation in sizing dies, especially on the smaller sizes of forgings. Generally, this re-striking operation is done cold, though occasionally at a low heat.

WHERE DROP FORGINGS ARE USED

"The greatest tonnage in drop forgings is in the carbon steels and principally of steels below 0.40 per cent. in carbon content. The proportion of tool steel forgings used in the construction of various implements and tools is very slight, but may be properly classed among the carbon steels though high speed steels also form a feature of the drop forging product.

"The growth of the automobile industry has called into use a variety of alloy steels for parts where resistance to vibration is necessary, and forgings made of nickel steel, chrome nickel and vanadium steel now form a very large part of the product of many drop forging plants. These alloys, besides resisting vibration to a great degree, also furnish when properly heat-treated the remarkable wearing qualities so highly desirable in gears and similar parts. Copper and bronze forgings are also a considerable feature in the drop forging product, though these are restricted chiefly to electrical work and where resistance to corrosion is necessary.

"Within recent years many lines of forgings have been standardized with respect to style and size, so that they may be obtained from manufacturers without the need or expense of special forging dies to produce them. The larger part, however, of the drop forging product consists of forgings made to customers' individual designs. In most lines of manufacture the methods are somewhat uniform. In the drop forging

industry, however, there is a great difference in methods, due perhaps to the latitude within which it is possible to work and accomplish the same results."

The closing address of the convention was given by George Grafton Wilson, professor of international law, Harvard University. His topic was "Neutrality."

President Viall then declared the convention adjourned.

The Utilization of Time Study Data*

An Elucidation of the Latest Method of Analyzing Machine and Work-Handling Operations as a Guide in New Work—Concrete Example of Lathe Machining

BY ROBERT THURSTON KENT

Time studies can be taken in two ways. Each job that goes through the shop may have the watch held on it and the over-all time of the job or of its most important subdivisions noted. In the course of years there will accumulate a great number of records of jobs done and the time required for and the methods used in each. These records will prove invaluable in setting rates and fixing minimum times for similar jobs as they recur from day to day. Such a method of making time studies, however, is crude and expensive. It does not give that information most to be desired, aside from the length of time required for the job, as to the most efficient method of performance. It furthermore does not enable the fixing of an accurate rate on a new job unless it is quite similar to one which has been done before.

The second method—that used in shops which have had the greatest experience in this work and which are successfully applying the principles of Taylor and converting these principles into dollars in the shape of larger dividends, decreased production costs and highly satisfied labor forces—is the method of analyzing all machine and work-handling operations into the most elementary detail, separating each particular part of an operation into its smallest elements, and tabulating these elements together with their respective times. These elements are then grouped into appropriate classes and filed in such a manner that any element of any particular class can be readily found when desired. This being done, it is a comparatively easy matter to fix a time for a job which has never before been done in the shop, with the certainty that the time so set will be accurate, fair alike to employer and employee, and whose accuracy can be demonstrated to the workman at any time if he sees fit to question it. The method of consistent machine analysis will enable the manufacturer to accumulate in a comparatively short time an amount of time study data which will be applicable to a large portion of the work of his shop, and every addition to the data will widen the scope of his time study and rate setting department in an increasing degree.

In general, machine work can be divided into the turning of cylindrical surfaces, the planing or milling of flat surfaces and the drilling and boring of holes. Every piece that enters into a machine tool is a combination of these various surfaces. This gives us our first subdivision of our time study element. If we know the time required to turn a given cylinder of a known diameter, to plane or face the ends of it and to drill a hole through it, we have a means of ascertaining with fair accuracy just how long it will take to produce the piece in the machine shop. It is unnecessary to add to the time required for performing these various machine operations the time necessary to put it in the lathe or planer and the drill press and to remove it from these machines. We, therefore, sub-

divide our time studies, first by the machines on which they are made.

OPERATIONS POSSIBLE ON A LATHE

Each machine should be studied in the greatest detail in order that the various operations which can be performed upon that machine may be combined with one another to represent the sequence which is to be followed in producing any given piece. This is not as large a job as it seems. Although almost any kind of machine work can be carried out in the ordinary engine lathe, the number of individual operations that a lathe will perform is comparatively limited. Thus the entire art of lathe work may be comprised in the following:

We may shift the belt from one cone to another; engage or disengage the back gears; change the feed gears; move the carriage along the ways; operate the cross slide; set the compound rest; throw in or out the automatic feed operating either carriage or cross slide; move the tail stock from one position on the ways to the next; set the tail stock over one way or the other for the purpose of turning tapers, or, if the machine has a taper attachment, connect the cross slide to it or disconnect it; put on or remove a steady rest or follow rest; remove the face plate and put on a chuck, or vice versa; remove or replace head and tail centers; put in the tool post or remove from it one or another type of tool; start or stop the machine; engage or disengage the nut for screw cutting; advance or retreat the tail center.

These 14 operations represent practically everything that can be done with an engine lathe and yet their combination in varying sequences and numbers will enable us to perform pretty nearly any job of machine work which may be desired.

It therefore becomes evident that by making an exhaustive study of all the lathes in a machine shop, that is all the lathes which have different characteristics, we have accumulated an amount of data which will enable us to fix unit times for the performance of all the jobs which it is possible to do in the lathes in that shop. In similar manner the operation of a planer, a shaper, a drilling machine, a slotter, a boring mill, a milling machine or any other machine tool can be resolved into a comparatively small number of machine movements, which can be studied as to the time required for each and which can later be combined in any shape and sequence necessary for the performance of any job which may come to that machine.

A STUDY OF BORING MILL PERFORMANCE

It is obvious, therefore, that the method of analyzing a machine and its handling time will be productive of real results in the shape of accumulated data more quickly than will any other method of time study. It is true that the machine operations must be analyzed and studied completely before the data can be used. A partial study will be of but little value in setting a

*Paper read before the National Machine Tool Builders' Association, Atlantic City, N. J., May 20, 1915.

general run of tasks, for in all probability the particular machine item which may be needed in setting the task on a given job will be the one on which no time study has been made.

The complete study of a large number of machines does not require such a great amount of time as might be imagined. The writer's colleague, Dwight V. Merrick, during the summer of 1914, made an exhaustive set of studies on a full line of Gisholt boring mills, ranging from 30 to 84 in. and comprehending every possible machine movement that could be made on a boring mill, including even the oiling of the machine. The investigation, which was probably more comprehensive than any time study investigation ever taken on a similar basis, occupied less than four weeks; that is, the actual making of the time studies. The analysis of the studies after they were made and the setting of unit times for every possible operation that could be performed on the Gisholt mill required about four weeks' additional time on the part of Mr. Merrick and the writer. The entire investigation, including the analysis and setting of unit times, required the equivalent of 12 weeks' time of one man and about four weeks' time of a \$15-a-week clerk who manipulated the adding machine in obtaining the unit time differences from the observation sheets. If we had the same job to do over again the time could have been materially shortened.

MANIPULATION OF A LATHE TOOL

We have seen how time study data should first be subdivided according to machines and then according to machine operations. We will go into this detail a little more closely to illustrate how finely the different machine operations should be subdivided before they are tabulated for recombination into elements forming complete jobs in the shop.

One of the commonest operations which occurs in lathe work is the placing of the cutting tool in the tool post prior to cutting metal and the removal of it from the post upon the completion of the machine operation. The time given in studies on lathe work made by Mr. Merrick for putting an ordinary $\frac{3}{4}$ -in. turning-tool in the tool post of a 24-in. lathe is 0.30 min. This time is made up as follows:

	Min.
Get tool from tray at end of lathe.....	0.03
Measure height of tool.....	0.06
Put packing in tool post.....	0.07
Set tool in position.....	0.03
Tighten tool post set screw.....	0.08
Total	0.30

The time for removing the tool from the post is tabulated as follows:

	Min.
Loosen tool post set-screw.....	0.03
Remove tool to tray at end of lathe.....	0.05
Total	0.08

If it is necessary to change from one tool to another during the course of the machine work, we have in the same tabulation an item entitled "changing tool." This is made up, as shown below:

	Min.
Remove tool (as above).....	0.08
Put in new tool (as above).....	0.30
Total	0.38

In the same tabulation we find one more item, "set tool for bearing—0.17 min." This item refers to the setting of a square-nose finishing tool to bring it square with the surface of the work, and is to be added to the time required for setting the tool in the post. Thus, if we had to set in the tool post a square-nosed finishing tool the analysis of the operation would appear as in the first table with the additional item "set tool for bearing" added, and the total time would be 0.47 min. instead of 0.30 min.

While the operation of tool handling is analyzed in the detail explained above, it is in practice put on the instructions issued to the men in the form shown. The total time only for the entire operation of tool setting will be given, appearing on the instruction card as an item "set tool in post—0.30 min." The

value, however, of the detailed analysis is that if the time 0.30 min. is ever questioned as being too long or too short, we have available the elements which enter into the making up of this time and can easily ascertain in which particular part of the study the workman or the time study man was at fault. This is not a particularly good example of this advantage, as the time 0.30 min. is not liable to be questioned unless it is one that recurs quite frequently.

FIXING TIME FOR TOOL ADJUSTMENT

In the first table which we cited, that giving the time for putting an ordinary turning tool in the tool post, we had a list of all the elements common to any tool. In establishing unit times for handling different types of tool than the ordinary round-nose turning-tool, we have only to add to the elements for that tool those items which are different in the tool under consideration. We have already seen what change is made in the analysis for a square-nose tool. For a chamfering-tool or a facing-tool we have only to add to the analysis for the turning-tool the item of setting the tool to a bearing. For a thread-tool we have to add the additional item, "set tool to thread-gauge." Thus in determining unit time for handling any type of tool in the lathe we can simplify both the time study and the tabulation by first studying the handling of that tool which contains all the elements which the other tools require and then studying those particular elements which are different in the remaining tools.

After having determined a series of elements of various character, such as the putting of the tool in the tool post, these elements can be combined with others similarly determined to form complete fundamental operations which enter into the completion of a definite job. Such a fundamental operation is the setting and starting of a cut. In the compilation of time study data with which the writer has been working for a number of months, the setting and starting of cuts in a great many different sizes of lathes and with practically every variety of cutting tool are tabulated in a manner similar to the following. This tabulation is for the setting and starting of a cut with a round-nose, rough turning-tool in a 24-in. lathe:

	Min.
Put tool in post and tighten.....	0.30
Start machine	0.03
Set calipers	0.35
Set cut by eye or calipers.....	0.20
Put feed in.....	0.03
Total	0.91

In writing up the instruction card, this item would be listed simply as "set and start cut, PRB $\frac{3}{4}$ -in. tool—0.91 min." After the cut has been completed, if the tool is to be removed, the following items are taken together from the analysis to give the time for stopping the cut and removing the tool:

	Min.
Throw feed out.....	0.03
Run tool half way back.....	0.05
Run carriage back.....	0.05
Stop machine	0.10
Loosen and remove tool.....	0.08
Total	0.31

On the instruction card this item would appear simply as "stop machine, remove tool—0.31 min." If, however, the tool was to be run back to the beginning of the cut and an additional cut taken we would use another set of items appearing in the same tabulation, as follows:

	Min.
Set cut by eye or calipers.....	0.20
Put feed in.....	0.03
Throw feed out.....	0.03
Run tool half way back.....	0.05
Run carriage back.....	0.05
Total	0.36

It will be observed that in this tabulation the same items appear as appeared in the former ones, except that they are grouped slightly differently and the items of removing the tool and stopping the machine are omitted, as these operations are not performed when repeating a cut without removing the tool from the tool post. These tables are a fine example of how

elementary time study enables one to build up unit times for different operations. Having the data necessary to fix a time for setting and starting a cut, analyzed in the detail exhibited in the first two tables above, it is unnecessary to make a study of the time required for an additional cut.

The man familiar with machine work can list without any trouble just what motions the lathe hand goes through in running his tool back and restarting the cut. These are as given in the table above. Having the time for these various items exhibited in the earlier tables, it is only necessary for him to set them opposite the items in the new table and total them and he has the proper unit time for making an additional cut with the same tool.

CONCRETE ILLUSTRATION OF A LATHE JOB

Examples could be multiplied indefinitely to show how the various elements are combined and built up to form larger and larger fundamental operations until we have a total time for a complete job. The above, however, is probably sufficient to indicate the principle involved. We will now take up a concrete illustration of the application of the principles of elementary time study to the preparation of an instruction card for a job of lathe work.

The instruction card, which is shown herewith, is modified in form in order that the different classes of elementary times may be separated for purposes of illustration. In all time study we divide the work into general classes of preparation time; that is, the time

necessary to prepare the machine for receiving the work and for restoring it to its standard condition after the job is done, and the handling time of the work itself, or the time required to place the work in the machine, remove it and perform any manipulations which are necessary to put it in place for machining. This includes hoisting and landing it in the machine, chucking, truing, leveling, squaring and similar operations; tool handling time, or the manipulation of the cutting tools, putting them in the tool posts, removing them, etc.; machine handling time, or all machine manipulation, such as moving the carriages, changing speeds, setting and starting cuts and similar operations, representing the time actually employed by the machine in removing metal. The first four sets of times are determined by elementary time study. The last set of times can best be determined by means of the slide rules devised by Mr. Barth. To use these slide rules, however, requires that the machines be standardized as to feeds, speeds and pulling power according to the rules formulated by Mr. Barth. Unless this standardization has been made the machine time must be determined by other methods which are slower and more cumbersome.

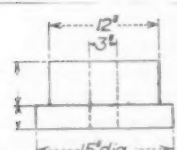
PREPARATION OF THE INSTRUCTION CARDS

Referring now to the instruction card we see that it calls for the machining of a cast-iron piece weighing about 200 lb. which is to be finished all over and to have the hole in the center bored. It is assumed that a roughing and finishing cut is to be taken for every operation and that different tools are to be used for turning and facing, this being in accordance with the practice of the shop from whose time studies this instruction card was written.

An inspection of the card will show that the first operation is the removal of the face plate which normally remains on the machine and the replacement of it by a four-jaw independent chuck. A reference to a tabulation of times for handling face plates and chucks shows that 0.49 min. is required to remove the face plate and 2.08 min. to lift the chuck from the floor by means of a hoist and screw it upon the spindle of the lathe. Both of these items are in the tabulation subdivided into their elementary details as explained earlier. Another tabulation shows that it requires approximately $2\frac{1}{2}$ min. and 2 min. respectively, to land a 200-lb. piece of the approximate dimensions shown in the lathe chuck and to true it. The sequence of operations followed in machining the work is clearly shown by the instruction card, including the turning of the work end for end in the chuck in order to turn and face the flange of the piece.

It will be noted that although there are 57 different items listed the actual number of operations performed is considerably less than this. A study of the card will show that most of the operations, such as "set and start," recur from time to time. We have in item No. 6 our old friend "put tool in post—0.30 min.," while in items Nos. 12, 18, 22, 29, 43, 46, 49, the combination of the items "put tool in post" and "remove tool from post." It will be recollected that the sum of these two items as given earlier was 0.38 min. We could in writing the instruction card of course, have subdivided the items "change to rough facing tool," etc., as above, and given the separate times of 0.30 min. and 0.08 min., but this would have accomplished nothing except to increase the length of the instruction card. The two items are, therefore, combined in one as shown.

Referring next to item No. 9, "set and start cut 0.23 min.," this is made up of the items of setting the cut by calipers, starting the machine and throwing in the feed. We have the same time in item No. 40, which is a cut started under the same conditions as that represented by item No. 9. In item No. 13 we have a time of 0.34 min. for setting and starting cut. It will be observed, however, that this is a facing cut and that there are some additional operations to be performed as compared to a simple turning cut. These include the tightening of the carriage nut after the cut is set and the loosening of it at the conclusion of the cut. In items Nos. 23 and 51 we see a still differ-



Material: Cast Iron
Weight: 200 lb.
Finish all over

	Preparation	Handling Work	Handling Tools	Handling Machines	Removing Metal
1. Remove faceplate from lathe.....	0.49				
2. Put chuck on lathe—use hoist.....	2.08				
3. Move tailstock back.....				0.28	
4. Land piece in chuck, gripping large diameter.....		2.53			
5. True piece in chuck.....		2.03			
6. Put rough turning tool in post.....			0.30		
7. Change feed and speed.....				0.50	
8. Set calipers.....	0.35				
9. Set and start cut.....				0.23	
10. Rough turn on small diameter.....					2.75
11. Stop machine, run toolpost back.....			0.15		
12. Change to rough facing tool.....			0.38		
13. Set and start cut.....				0.34	
14. Rough face flange.....					1.25
15. Move carriage to end of piece, set and start cut.....				0.43	
16. Rough face small end.....					3.25
17. Stop machine, run toolpost back.....			0.10		
18. Change to finish turning tool.....			0.38		
19. Set and start cut.....				0.43	
20. Finish turn small diameter.....					2.75
21. Stop machine, run toolpost back.....			0.10		
22. Change to finish facing tool.....			0.38		
23. Set and start cut.....				0.47	
24. Finish face flange.....					1.25
25. Move carriage to end of work.....				0.10	
26. Set and start cut.....				0.28	
27. Finish face end of piece.....					3.25
28. Stop machine, move carriage back.....			0.10		
29. Change to rough boring tool.....			0.38		
30. Set and start cut.....				0.36	
31. Rough bore hole.....					4.00
32. Run carriage back, change to finish tool.....			0.67		
33. Set and start cut.....				0.36	
34. Finish bore.....					4.00
35. Run carriage back, stop machine, remove tool.....			0.23		
36. Turn piece end for end in chuck.....		3.13			
37. True piece in chuck.....		2.03			
38. Run carriage up.....				0.05	
39. Put rough turning tool in post.....			0.30		
40. Set and start cut.....				0.23	
41. Rough turn edge of flange.....					1.75
42. Run carriage back.....				0.05	
43. Change to finish turning tool.....			0.38		
44. Set and start cut.....				0.43	
45. Finish turn flange.....					1.75
46. Stop machine, change to rough facing tool.....			0.38		
47. Set and start cut.....				0.34	
48. Rough face flange.....					4.00
49. Run toolpost back, stop machine.....				0.05	
50. Change to finish facing tool.....			0.38		
51. Set and start cut.....				0.47	
52. Finish face flange.....					4.00
53. Stop machine, run carriage back, remove tool.....			0.13		
54. Remove piece from chuck to floor.....		1.49			
55. Remove chuck.....	1.59				
56. Replace face plate.....	0.88				
57. Clean machine.....	2.00				
Preparation time.....	7.39				
Handling work.....		11.21			
Handling tools.....			4.29		
Handling machine.....				5.85	
Removing metal.....					34.00
Total time for job.....					62.74

ent time for the setting and starting of cuts. These, it will be observed, are "finish facing cuts," and it will be recollected that in the setting of a finishing tool there is the additional item "set tool for bearing" to be added to the time required for setting the ordinary roughing and facing-tool.

SUMMING OF TIME OF OPERATIONS

Turning now to the totals of the several columns, it will be observed that 7.39 min. is required to prepare the machine for the work and to clean it up after the job is finished. The actual handling of the work consumes 11.21 min. The handling of the cutting tools requires 4.29 min. and machine manipulation accounts for 5.85 min. A total of 34 min. is required for the actual removal of metal, giving a grand total of 62.74 min. The fatigue allowance would bring the time for the job to about 75 min.

The interesting thing about these totals is that the machine is working only a little over 50 per cent. of the time, if the fatigue allowance is not considered, and less than 50 per cent. of the time if the allowance is taken into consideration. This points to two things: 1. The importance of studying closely the manipulation both of the machine and of the work. 2. The value of time study in increasing the relative producing time of the machine. Let us consider these two items in order.

OFFICE MAN SHOULD PREPARE INSTRUCTIONS

There is no doubt that a man sitting at a desk carefully studying a drawing of a piece such as is shown here can plan the sequence of operations in manufacturing it much better than the man at the machine, who must necessarily keep his attention on the work while the machine is in operation and do his planning between cuts or do it all in advance of starting work. In either event the machine will be idle a greater length of time than is necessary. The man at the machine will have a tendency to consider each operation by itself and thus introduce more machine manipulations than are necessary.

For instance, the chances are that left to his own initiative the workman would introduce the finish turning cut immediately after the first rough-turning cut, requiring an additional machine manipulation as compared with the method laid down in the instruction card which calls for the rough-facing cut immediately after the rough turning cut, thus saving running the carriage back once. With the work planned for him by a man preparing an instruction card showing the best method and the one requiring the least handling of tools and machine, the workman can keep his machine at the business of making chips for the greatest possible length of time, and it is only while it is making chips that a machine is making money for its owner.

MUST CHECK HANDLING AND CUTTING

The second item has in part been covered above, but the particular feature in mind is that the handling time in machine work bears a much greater proportion to the total machine time than is commonly realized. It gets us little if we standardize our machine so that we can use Mr. Barth's slide rules and thereby set speeds and feeds, which will reduce the time required in removing metal by 10 or 15 per cent. if we do not at the same time set an equally high standard for the necessary but unprofitable work from the standpoint of machine earning capacity of handling and manipulation. If we decrease the cutting time 10 per cent., but at the same time do not check the workman up on his handling time so that he increases it 15 per cent. to be sure that he will not produce too much in a day and therefore suffer a cut in rate, we have actually lost money if the ratio of handling and machine time is about as was shown in the example just exhibited.

By itemizing the handling operations as was done in the instruction card just shown and by setting unit times which have been carefully determined by elementary time study, we have furnished a standard of

performance to which we can hold the workman. The standard is not an unfair one because it is determined by the performance of other workmen and is a standard which if the time study has been accurately made is one which can easily be obtained by the ordinary good man. The mere fact that there is a standard by which the performance of the workman can be measured will in itself tend to increase the effort of the man to do his best. The standard being present, any failure to attain it can be investigated and the particular point wherein the man failed can be indicated to him, and his fault corrected. It has been found time and again that where this standard of performance has been omitted the handling time in all machine work has gradually increased with a consequent decrease in the relative producing capacity of the machine.

In preparing an instruction card from tabulated elementary time study data, the best method is for an instruction card man, who by the way should be a man well versed in the best methods of his trade, to dictate to a stenographer or clerk the elementary operations for the performance of the job in hand. After writing the card the stenographer or some other clerk takes it to the time study data file and fills in the elementary unit times from the recorded data. This method not only saves the time of the high-priced instruction card man, who can render his best service by preparing cards and improving methods, but it also insures that accurate times will be set on the cards. The instruction card man is too apt to attempt to trust to his memory for certain unit times which recur more or less often, and in addition there is more or less tendency for him to use his judgment in certain cases as to the proper time rather than take the trouble to look it up in the files. Either condition is conducive to inaccurate rate setting. By intrusting the actual entering of the unit times to a clerk who knows nothing about machine work and who has only to copy figures from established records, this tendency to error is avoided.

National Association Stove Manufacturers

The annual meeting of the National Association of Stove Manufacturers was held in the Hotel Astor, New York, May 12 and 13. James A. Lansing, the retiring president, who had served for two years, was presented with a gold-mounted gavel, made from the wood of an apple tree on the estate at Cohoes, N. Y., owned and occupied by five generations of the Lansing family. The members of the New England Stove Manufacturers' Association presented to the National Association a specially designed table cover and an ebony gavel block intended for use at that and future conventions.

Secretary of Commerce Redfield addressed the convention on the business situation of the world, with its peculiar effect on conditions in the United States. He was followed by Lazard Kahn, Hamilton, Ohio, who analyzed the influences leading up to the present business situation. An illustrated lecture on the manufacture of pure iron was given by E. H. Ahlbrandt, American Rolling Mill Company, Middletown, Ohio.

The officers elected for the coming year are as follows: President, Lewis Moore, Joliet, Ill.; first vice-president, Frederic Will, Rochester, N. Y.; second vice-president, Lee W. Van Cleave, St. Louis; treasurer, Charles F. Mertz, Rochester, N. Y.; secretary, Percival W. Elliott, Boston; cost expert, F. J. Stephenson, Hoosick Falls, N. Y.; general executive committee, Charles A. Du Charme, Joseph W. Emery, James A. Lansing, Frank S. Ouerbacker, George D. Wilkinson, Richard E. Warner and Russel E. Sard. It was decided to hold the next annual meeting in New York City.

The William Cramp & Sons Ship & Engine Building Company, Philadelphia, is reported to have received a substantial order for small motor boats to be used for dispatch service by the Russian Government. It is believed that the order will be sublet to smaller boat-building companies.

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Scarcity of Skilled Mechanics

That the scarcity of skilled mechanics, particularly machinists, has reached an acute stage in some sections of the country is quite generally admitted. Builders of machine tools and makers of munitions of war are the principal complainants. For years attractive wages and superior shop conditions have served to recruit skilled workmen for the automobile shops. Naturally the men were taken from other places of employment and to no small extent from shops in which machine tools were built. At present, not only the automobile makers but the manufacturers of war materials and the busy builders of machine tools are casting about for men.

So far as the shrapnel and explosive shell makers go, they want a great many men skilled in the operation of some one of three or four machines, and the demand far exceeds the supply. A machine-tool company which recently wanted to get four men to act as supervisors of less experienced operatives addressed 60 letters to men whose names had been placed on its opportunity list at their request, only to find that not one was available. Some concerns having war orders have tried to overcome the difficulty by so dividing and specializing their machining operations that practically unskilled labor might be employed. The plan is working out, but a distressing amount of supervision was and is still necessary, while the irregular first results caused much anxiety. It is needless to say that what amounts to launching a great new manufacturing enterprise with a rapidity unknown in time of less pressure is a great task. The difficulties encountered have added gray hairs to more than one head.

In New England the shortage of skilled help is serious. The managers of machine-tool plants which were not busy at the outset of the war and did not have any immediate call to speed up their operations loaned some of their men to other plants on which demand fell more quickly. The lenders had the welfare of their men in mind, and were disposed to perform a fraternal act to fellow manufacturers. Later, when all became busy, those who had loaned men looked for them to return, but many of the transferred employees refused to do so. They liked their new surroundings and some had found ways of increasing their wages. The establishment on a new basis of some large factories in New England, for the production of war materials, is regarded as promising a still greater demand for

machine-tool operatives and consequently a greater shortage. Securing men willing to go on the night shift, always more or less difficult unless the remuneration is made very attractive, is likely to become an even greater problem.

The entire question is one which machine-tool men talked over earnestly at their convention in Atlantic City last week. One who has had to do with almost every phase of machine tools, from their operation to building and selling them, gives as his solution of the problem a wider use of automatic machines, with work systemized and specialized, including a more general adoption of time study. Men taken from the farm, he contends, can often be used to better advantage than can skilled machinists, inasmuch as the former have less to forget. His ideas, which are by no means new, lend special interest to the paper read by R. T. Kent at the Atlantic City convention, in which is a concrete example of the way lathe work may be analyzed and time apportioned for each step in every operation. Much as it is to be regretted on some accounts, events continue to emphasize the fact that the day of the old-fashioned, all-round mechanic is gone.

Italy's Position in Iron

Italy's entrance into the European war makes timely a reference to her position in iron and steel. While the Italian iron and steel industry is of small proportions, judged by our common tonnage standards, it is of particular interest on account of the limitations geology has imposed. Italy has very small coal and iron reserves, and the size of the Italian iron and steel making industry is remarkable in the circumstances. Inasmuch as Italian statistics are always belated precise reference cannot be made to the situation at the moment, but in general it may be said that Italy has been producing about 2,500,000 tons annually of coal, coke and briquettes, but has been importing 10,000,000 tons. One would not expect an iron industry to thrive in a country so positioned, particularly a tin-plate industry, for in converting the steel sheet bar into black plate ready for tinning the steel is heated to rolling or annealing temperature no less than six times. Yet since 1907 Italy has made from 25,000 to 35,000 metric tons of tin plate, or considerable more than half a million boxes, per annum, thus supplying about two-thirds of her tin-plate requirements.

In iron ore Italy is almost as poorly provided,

practically all the available supplies being confined to the island of Elba, and it was computed a few years ago that these deposits would be exhausted by 1920. From 1907 to 1911 inclusive the iron-ore production slightly exceeded half a million tons, but it is doubtful if such a rate has been maintained to date, and imports from Spain and the north of Africa, very light during those years, have probably increased. It may be noted that as Elba is but a few miles from the mainland, north of Rome, it is improbable that the war will menace the ore movement from Italy's own mines.

Thus situated, it is natural that the Italian wrought-iron and steel industry has been compelled to place much dependence upon imported pig iron and scrap. For the size of its industry Italy has been a remarkably heavy importer of iron and steel scrap, the imports averaging 400,000 tons a year in recent years. Pig iron has been imported to the extent of 200,000 to 300,000 tons a year, supplementing a domestic production of 300,000 to 400,000 tons, established chiefly during the past ten years. The imports in 1913 were 221,697 metric tons of pig iron and 321,697 tons of scrap.

With these supplies, augmented probably by a considerable domestic production of scrap, Italy has been able to produce about a million metric tons annually of rolled iron and steel, including about 300,000 tons of rolled iron, 100,000 tons of steel rails and 600,000 tons of other rolled steel products. This material has been almost sufficient to meet the country's consumptive requirements, as imports of finished material and manufactured goods have been light, with the exception of wire rods, of which about 100,000 tons a year is imported. As an illustration, less than a thousand tons a year of nails, screws, etc., is imported.

Since the war started Italy has been a buyer of American coal, as the usual supplies from England and Germany were cut off. In 1913 the coal imports were 9,647,000 tons from Great Britain and 1,073,000 tons from Germany, while in 1914 the imports were reduced by 1,022,000 tons in the case of Great Britain and by 254,000 tons in the case of Germany. In 1913 41 per cent. of the German coal was delivered via the St. Gothard railroad, but since the war started this has been the only route open for German coal. The shipments were only 150 tons in August, rising to 12,000 tons in September, 27,000 tons in October, 35,000 tons in November and 48,000 tons in December. It is to be presumed that they have been still heavier of late; and whatever they are, they are, of course, instantly shut off by the war. As the movement from Great Britain had already been decreased, it is to be presumed that the Italian demand for American coal will now be greatly increased.

It may be of interest to note that the Italian railroad system comprises nearly 11,000 miles, double that of Belgium, but from one-third to one-fourth as much as the mileages respectively of the other great countries involved in the war. The steel works are quite different in magnitude from those of the other steel making countries. Although the production is so limited there are, besides the well known Elba, Ilva and Piombino works, at least 16 plants producing open-hearth steel, in furnaces running generally from 20 to 25 tons capacity.

Galvanized Sheets and Substitutes

In 1913 the production in this country of galvanized iron and steel sheets and of formed products galvanized after forming approached one million net tons, the exact figures being 808,818 gross tons of the former and 66,664 tons of the latter, making a total of 875,482 gross tons. In a year of normally good demand the amount would probably be still greater. On May 18 the advance in spelter, which has been the spectacular feature of the metal markets for months, carried the price to a point precisely double the highest level attained prior to this year. The previous high point had been 7.50 cents, East St. Louis, in October, 1912. On May 18 last spelter for May shipment was scarcely obtainable at 15 cents, East St. Louis, and since then there have been further and sharp advances.

The cost relation between galvanized sheets and sheets coated with other metals is thus altogether altered. On May 17 the American Sheet & Tin Plate Company advanced its price on No. 28 gauge galvanized sheets from 3.40 cents to 3.60 cents, and according to assertions made in the trade 3.60 cents is too low a price even for 13-cent spelter. It is suggested, for instance, that 2.60 cents for 28 gauge was below the cost of manufacture with 5-cent spelter, while at $1\frac{1}{2}$ oz. spelter consumed per square foot an advance in sheets from 2.60 cents to 3.60 cents would cover an advance of only $8\frac{1}{3}$ cents in spelter. While 3.60 cents is not an extremely high price for galvanized sheets, 3.75 cents having been reached in 1907 and 3.50 cents in 1909 and 1912, black sheets as well as sheets coated with other metals are much cheaper now.

With a normal demand for a million net tons of galvanized sheets, for numerous and widely different uses, there is already a tendency to substitute, and if the cost of galvanized sheets increases further, and indeed spelter may become absolutely unobtainable, additional substitutions will be forced.

As several manufacturers have already quoted galvanized sheets on a basis of 4 cents, some comparisons may be made between such a price and the cost of other materials. Per square foot, 28 gauge galvanized sheets would be slightly higher than the price of I. C. 40-pound coated terne plates, the heaviest coating it is feasible to apply, and about the cost of IXX ternes with 35 pounds coating. This latter product is a material with a steel base weighing approximately as much as 28 gauge galvanized sheets, with their coating, and with a terne coating weighing more than the spelter coating of galvanized sheets, thus being obviously a much superior article for the purposes to which it is adapted.

Compared with 28 gauge galvanized sheets at 4 cents per pound, 19 gauge black sheets would be somewhat cheaper per square foot, although the weight of the latter is $2\frac{1}{4}$ times that of the former.

Of particular interest is the determination reached in the past fortnight by several sheet manufacturers, to attack again the problem of placing on the market a lead coated sheet. Nearly 20 years ago, when the American tin and terne plate industry was still more or less in its infancy one of the pioneer manufacturers, at Irondale, Ohio, placed on the market a lead coated sheet, but the product did not meet with an enthusiastic reception. At vari-

ous times since then such sheets have been offered, but there does not seem to have been sufficient inducement to give them a wide vogue. The conditions are now altogether different, with spelter already at approximately four times the price of lead. Between an ordinary lead-coated plate and the standard terne plate there is, moreover, a wide field. The long ternes which have been on the market for years and are made by a half dozen mills or more frequently carry a heavier lead proportion than the regular 20 x 28 ternes. It would be quite feasible to produce such material with a 90 lead 10 tin mixture, and this mixture at present market prices, New York, would cost about 7½ cents per pound.

Sheet zinc is likewise afforded new competition. For the first time in the history of the aluminum industry sellers of sheet aluminum can offer their product as a cheaper one than sheet zinc, volume for volume. The base price of sheet zinc fluctuated between 7 cents and 8.75 cents in 1914, but successive advances have come this year until that of May 20 put the base price at 19.50 cents, when spelter was approximately 16 cents. As the weight of rolled aluminum is only about 38 per cent. of that of sheet zinc the advantage, volume for volume, is all in its favor when the price per pound is only slightly higher. The strength and stiffness, of course, are determined not by weight, but by thickness, and the tensile strength of sheet aluminum is from two to three times the tensile strength of sheet zinc.

The American Shipyard Boom

International Marine Engineering, New York, an authority on shipping questions, says:

"Owing to the great war in Europe, prices of steel used in shipbuilding have risen to a point very materially higher than that at which steel is sold for shipbuilding in the United States. When there is added to this increased cost of material the large increase in wages, the cost of building ships in British and Continental yards is higher than it is in the United States. Furthermore, practically all the British and Continental shipyards are occupied very largely, if not fully, on naval work, so that very few orders are being placed for new merchant marine vessels. With existing tonnage in Europe decreasing at an abnormal rate, there is great anxiety as to where the ships are coming from to handle the ocean traffic after the war is over. As a consequence, ship owners in Great Britain, Spain, Portugal, Germany, France, Russia, Denmark, China and other countries are inquiring as to the possibilities of having vessels built in the United States. Meantime, nearly every steamship company flying the American flag is looking for new vessels. These companies include the Ward Line, pier 14, East River, New York; the Union Sulphur Company, 17 Battery place, New York; the Matson Navigation Company, San Francisco; the Gulf Refining Company, 21 State street, New York; the Savannah Line, pier 35, North River, New York; the Luckenbach Steamship Company, South Ferry Building, New York; the Clyde Line, pier 36, North River, New York, and the Merchant & Miners Transportation Company, Baltimore. There is scarcely an American shipyard that can contract for a ship for delivery inside of 20 to 24 months. With all the business in hand and in sight, American shipyards have all the work they can possibly handle for at least five years to come."

Safety and Sanitation Rules for Ohio Foundries

The committee having in hand the framing of safety and sanitation regulations for foundries in Ohio held its third session at Springfield, Ohio, May 20 and 21. At the public hearing on the second day about 50 persons were present. Victor T. Noonan, Safety Director of Ohio, presided at both meetings. The New York rules, in connection with those offered by the Ohio committee, of which Thomas D. West is chairman, came up for further consideration.

The chief discussion between the foundry employers and labor representatives was on the New York rule that "the cleaning and chipping of castings shall be done in cleaning rooms, except that where traveling cranes, or in existing installations, cars are used for conveying castings into such rooms, a separating partition shall be erected which shall be not less than 12 ft. in height." The steel founders present agreed with J. J. Bever, manager of the foundry department of the Otis Steel Company, Cleveland, in contending that the rule was impractical and would work a great hardship to steel founders. As the labor representatives would not yield to any amendment, the rule was allowed to stand, but it may be carried to the State Industrial Commission or to the courts.

There was much discussion also of the rule that "no cores shall be blown out of castings by compressed air unless such work is done outside the foundry building or after the regular working hours." Representatives of several large steel foundries wanted this rule changed to permit such work being done in regular working hours by providing screens, but the labor forces would not concede this. The requirement that a shower bath be provided where 20 or more men are employed, and an additional shower for each 100 men, the rule being applicable to existing foundries at the discretion of the Industrial Commission, was adopted. Other New York rules were also adopted, together with a number which had been drawn up by the Ohio committee.

A paper by Thomas D. West on "State Honors for the Prevention of Accidents Due to Carelessness" was read by Chairman Noonan. Its principal suggestion was an appropriation by the State of Ohio of \$11,000 to be distributed in ten prizes to firms making the greatest advance in reducing accidents due to carelessness, the firms in turn to distribute the prizes among foremen, safety committees and other workmen. The suggested amount for the first prize was \$2000. At the previous meeting of the committee, which was held at Cincinnati, a resolution was passed asking for an appropriation by the State of \$200,000 to prosecute the work of the Industrial Commission in reducing accidents. This resolution has been received with favor by Governor Willis.

The twenty-eighth general meeting of the American Electrochemical Society will be held in San Francisco September 16 to 18. The American Society of Civil Engineers, the American Society of Mechanical Engineers, the American Institute of Electrical Engineers and the American Institute of Mining Engineers expect to hold their meetings at the same time and arrangements are under way for joint sessions with some of these societies. The holding of this meeting immediately before the date for the International Engineering Congress, September 20 to 25, will also enable the members to attend the sessions of the Congress. All inquiries in regard to transportation should be addressed to J. M. Muir, 239 West Thirty-ninth street, New York, chairman of the transportation committee.

The city of Gary, Ind., was nine years old April 18. It now boasts 40,000 population, of greater diversity than any other city of its size in the country. It is known as the melting pot of the State, few nationalities being apparently unrepresented. Thomas E. Knotts, the first mayor, has a photograph of the marshes and sand dunes taken April 18, 1906, and recently found that the spot where he stood to take the picture is now occupied by a five-story business block.

SECOND-HAND MACHINE TOOLS

Dumping After the War Not Feared — The Situation in England

J. W. Carrel, sales manager of the Lodge & Shipley Machine Tool Company, Cincinnati, Ohio, returned last week from England where he spent several months. He does not coincide in the views of some machine-tool builders as to the probability of a large number of second-hand machines being dumped on the market after the war, by shops now engaged in making war munitions. Under the stress of war demand manufacturers in England have added heavily to their equipment; but they were justified in doing this, as most Government contracts cover a period of three years. This has enabled firms to go ahead with their purchases of machinery without regard to the probable length of the war.

Mr. Carrel found the opinion general in England that the rehabilitation period, immediately after the war, will be an active one for manufacturers. He calls attention to the fact that large numbers of antiquated machine tools are in use in Europe and that naturally these will be the first to be consigned to the scrap pile after the rush is over, being replaced by modern American tools. The superiority of the American machine tool is an additional factor that will influence the situation after peace is declared, as workmen who become accustomed to operating these machines will dislike to make a change. Mr. Carrel points out that practically all countries in Europe are poor markets for second-hand machinery. It is the practice in England especially to use a machine until it is worn out, so that rebuilt machinery is naturally looked upon with a considerable degree of suspicion.

Concerning the labor situation in England, Mr. Carrel states that a large number of skilled mechanics volunteered for service at the beginning of the war and that shop substitutes were not very satisfactory. In many instances unskilled laborers were used for operating high-priced machines. While this practice will necessarily reduce the life of a machine tool, it will not have as much effect on the future demand for tools from this country as some have supposed, as most American machines are built to withstand more than ordinary rough usage.

Birmingham and Warrior River Navigation

The recent opening of Lock 17, completing the \$15,000,000 canalization of the Black Warrior River in Alabama, which extends the head of navigation to a point above Cordova, 450 miles from the gulf, brings Birmingham within 12 miles of navigable water. This lock, built by the United States Government at a cost of \$3,750,000, is located on Squaw Shoals, 26 miles north of Tuscaloosa. Its completion gives a channel six feet deep for slack water navigation the year round from Mobile to the coal fields of Alabama. It is claimed that river navigation will result in nearly halving freight rates to the coast on products from the Birmingham district. A municipally owned and operated railroad from Birmingham to the nearest point on the river is a plan receiving attention in that city. In a special number devoted to the benefits Birmingham will reap from Warrior River navigation, the Birmingham Ledger brought out a colored map of the State's waterways accompanied by much valuable industrial data.

The experiment station of the School of Mines of the University of Minnesota has issued Bulletin No. 3 on "Preliminary Concentration Tests of Cuyuna Ores" by William R. Appleby and Edmund Newton. The experiment station has undertaken a general study of the possibility of converting the large amounts of low-grade silicious iron-bearing material of the Cuyuna range ores into a marketable product. This preliminary bulletin outlines and describes the work done up to the present time.

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Georgia Coke Rate to the Coast Lowered

WASHINGTON, D. C., May 25, 1915.—The Interstate Commerce Commission has made an order directing a reduction in the freight rate on coke in carloads from Durham and Chickamauga, Ga., to Pacific coast terminals from \$10 to \$9 per net ton, and has also directed the cancellation of the tariff rule providing for a minimum carload weight of 50,000 lb. The order in this case is made as the result of the complaint of the Durham Coal & Iron Company and other companies operating coal mines and coke ovens in Georgia, the defendant carriers being the Central of Georgia, the Atchison, Topeka & Santa Fé and the Southern Pacific. The contention of the complainants was that the \$10 rate was unduly prejudicial to the extent that it exceeded the current rate of \$9 applicable to similar shipments from the Birmingham, Ala., district; also that it was unreasonable to the extent that it exceeded a rate of \$8 per net ton subject to a minimum carload weight of 40,000 lb. The commission decided that an \$8 rate would not be justifiable, as it would mean ton mile earnings from Chickamauga to San Francisco of only 2.89 mills.

Three vessels have arrived at Baltimore, Md., bringing manganese ore from Brazil. A fleet of schooners loaded with such ore is reported to be on its way to the same port.

The Iron and Metal Markets

COMMON LABOR SCARCER

Rail and Bar Orders Are Features

Flurry in Galvanized Sheets as Spelter Advances —Black Sheets Weak

The rate of production at the largest steel plants has been maintained, and in some cases, particularly in the Pittsburgh and nearby Valley districts, slightly increased. On the selling side some of the heavier lines show more activity, while lighter products are quiet. Buying for domestic use is marked by caution, in view of the issues raised with Germany, but there is no uneasiness.

The exodus of Italian workers to go to war is causing some concern, and there is more than a possibility of an actual shortage of common labor in some parts of the iron industry. The Connells-ville coke region will be affected and already a short supply of labor is reported in the West Virginia coal fields.

After some weeks of small business in rails, several orders have come out together—25,000 tons for the Southern Pacific placed at Ensley, 15,500 tons for the Lake Shore, 8000 tons for the Chicago & Alton and 4000 tons for the Chesapeake & Ohio, all to be rolled in the Chicago district. The Chesapeake & Ohio's total purchases are about 15,000 tons. If the Pennsylvania order comes as expected, the week will be the largest in months for rails.

The developments in the bar market are interesting. The mills are getting behind in deliveries, due to the filling up of capacity by shrapnel bar orders, particularly 2-in. rounds and larger. In the Central West a new inquiry is for 45,000 tons of 1 1/16 in. rounds for rifle barrels and at Pittsburgh a company that has a large contract for rifle barrels is negotiating for bars.

At the same time the large agricultural implement makers are slow to contract for their bar supply, seemingly awaiting further assurance concerning crops and the foreign situation. No issue is being made of the 1.20c. price on such contracts, as the bar market has been gradually stiffening with the placing of so much war tonnage. Iron bars are firmer, but in hard bars for reinforcing there is irregularity, sales being made at 1.05c., Pittsburgh.

The ascent of spelter above 18 cents, or to more than twice the highest price reached in any previous year, has caused a fresh flurry in galvanized sheets. Some makers have advanced their price to 4 cents for No. 28, and while the largest interest still quotes 3.60c. this price is only for prompt delivery and to regular customers. The soaring of spelter has set users of brass as well as of galvanized sheets on the hunt for substitutes.

Mills which are not quoting on galvanized sheets are going more vigorously after business in black

sheets and 1.70c. Pittsburgh for No. 28 sheets can still be done. In special sheets for automobiles no such weakness has appeared.

Plate mills have fared better in tonnage, due to the good car contracts of the past two weeks, but the car companies were able to buy at 1.10c., Pittsburgh. Recent buying for three additional vessels placed with Eastern shipyards also brought out low prices. Boiler plate demand has increased in the Central West.

Plate manufacturers are keenly interested in the inquiries from foreign countries with a view to placing merchant vessel work here. Foreign yards are full of naval work and the outlook is for full employment of American shipbuilders for the next three years.

Italy has been a good buyer of pig iron and steel scrap in this country for some months and later may increase her demands upon this market; but ocean freights are making pig-iron exports much more difficult.

All pig-iron markets have been quiet, but an increasing melt of foundry iron is indicated in some districts by requests to anticipate shipments which have sprung up in the past week. Canadian furnaces which sold 25,000 tons in this country last year have been looking into the situation again lately, but have found present prices too low to warrant repeating the performance.

In metal-working machinery the pressure of war demand is still heavy and many shops are being driven to their utmost. The scarcity of skilled mechanics is a problem, particularly in New England and in one or two centers in the Central West.

A Comparison of Prices

Advances Over the Previous Week in Heavy Type, Declines in Italics

	At date, one week, one month and one year previous			
	May 26,	May 19,	Apr. 28,	May 27,
Pig Iron, Per Gross Ton:	1915.	1915.	1915.	1914.
No. 2 X, Philadelphia...	\$14.25	\$14.25	\$14.25	\$14.75
No. 2, Valley furnace...	12.75	12.75	12.75	13.00
No. 2 Southern, Cin'ti...	12.40	12.40	12.40	13.75
No. 2, Birmingham, Ala.	9.50	9.50	9.50	10.50
No. 2, furnace, Chicago*	13.00	13.00	13.00	14.00
Basic, del'd, eastern Pa.	13.25	13.25	13.25	14.00
Basic, Valley furnace...	12.50	12.50	12.50	13.00
Bessemer, Pittsburgh...	14.70	14.55	14.55	14.90
Malleable Bess., Ch'go*	13.00	13.00	13.00	14.00
Gray forge, Pittsburgh...	13.45	13.45	13.45	13.65
L. S. charcoal, Chicago...	15.75	15.75	15.75	15.75
Billets, etc., Per Gross Ton:				
Bess. billets, Pittsburgh...	20.00	20.00	20.00	20.00
O.-h. billets, Pittsburgh...	20.00	20.00	20.00	20.00
O.-h. sheet bars, P'gh...	21.00	21.00	21.00	21.00
Forging billets, base, P'gh	26.00	26.00	25.00	25.00
O.-h. billets, Phila.....	22.02	22.02	22.02	22.40
Wire rods, Pittsburgh...	25.00	25.00	25.00	24.50

Finished Iron and Steel,				
Per Lb. to Large Buyers:	Cents.	Cents.	Cents.	Cents.
Bess. rails, heavy, at mill	1.25	1.25	1.25	1.25
Iron bars, Philadelphia...	1.17 1/2	1.17 1/2	1.15	1.20
Iron bars, Pittsburgh...	1.20	1.20	1.20	1.25
Iron bars, Chicago.....	1.15	1.15	1.15	1.10
Steel bars, Pittsburgh...	1.20	1.20	1.20	1.12 1/2
Steel bars, New York...	1.369	1.369	1.369	1.28 1/2
Tank plates, Pittsburgh...	1.15	1.15	1.15	1.10
Tank plates, New York...	1.319	1.319	1.319	1.26
Beams, etc., Pittsburgh...	1.20	1.20	1.20	1.12 1/2
Beams, etc., New York...	1.369	1.369	1.369	1.28 1/2
Skelp, grooved steel, P'gh	1.15	1.15	1.12 1/2	1.20
Skelp, sheared steel, P'gh	1.20	1.20	1.17 1/2	1.25
Steel hoops, Pittsburgh...	1.25	1.25	1.25	1.25

*The average switching charge for delivery to foundries in the Chicago district is 50c. per ton.

Sheets, Nails and Wire.

	May 26, 1915.	May 19, 1915.	Apr. 28, 1915.	May 27, 1914.
Sheets, Nails and Wire,				
Per Lb. to Large Buyers:	Cents.	Cents.	Cents.	Cents.
Sheets, black, No. 28, P'gh.	1.75	1.80	1.80	1.85
Galv. sheets, No. 28, P'gh	3.75	3.60	3.25	2.75
Wire nails, Pittsburgh...	1.55	1.55	1.55	1.55
Cut nails, Pittsburgh....	1.55	1.55	1.55	1.60
Fence wire, base, P'gh...	1.35	1.35	1.35	1.35
Barb wire, galv., P'gh...	2.10	2.10	2.10	1.95

Metals.

Per Lb. to Large Buyers:	Cents.	Cents.	Cents.	Cents.
Lake copper, New York.....	21.00	21.00	21.00	14.37 1/2
Electrolytic copper, N. Y.	18.50	18.75	18.62 1/2	14.12 1/2
Spelter, St. Louis.....	18.75	15.25	13.75	4.95
Spelter, New York.....	19.00	15.50	14.00	5.10
Lead, St. Louis.....	4.22 1/2	4.12 1/2	4.10	3.80
Lead, New York.....	4.30	4.20	4.20	3.90
Tin, New York.....	37.87 1/2	38.25	42.00	33.25
Antimony, Hallett's, N. Y.	none	none	32.00	6.80
Tin plate, 100-lb. box, P'gh	\$3.15	\$3.15	\$3.25	\$3.30

Coke, Connellsville.

Per Net Ton at Oven:				
Furnace coke, prompt....	\$1.50	\$1.50	\$1.50	\$1.75
Furnace coke, future....	1.65	1.65	1.65	1.90
Foundry coke, prompt....	2.00	2.00	2.00	2.40
Foundry coke, future....	2.15	2.15	2.15	2.50

Old Material. Per Gross Ton:

Iron rails, Chicago, U.S.S. Co.	12.25	11.75	11.75	12.75
Iron rails, Philadelphia...	15.00	15.00	14.00	15.00
Carwheels, Chicago, U.S.S. Co.	9.75	9.75	9.75	11.50
Carwheels, Philadelphia...	11.50	11.50	11.00	11.75
Heavy steel scrap, P'gh.	11.75	11.75	11.75	11.50
Heavy steel scrap, Phila.	11.00	11.50	11.00	10.75
Heavy steel scrap, Ch'go	9.50	9.50	9.25	9.50
No. 1 cast, Pittsburgh...	12.00	12.00	12.00	11.50
No. 1 cast, Philadelphia...	12.25	12.25	12.00	12.00
No. 1 cast, Ch'go (net ton)	9.00	9.00	9.00	10.00

Finished Iron and Steel f. o. b. Pittsburgh

Freight rates from Pittsburgh in carloads, per 100 lb.: New York, 16.9c.; Philadelphia, 15.9c.; Boston, 18.9c.; Buffalo, 11.6c.; Cleveland, 10.5c.; Cincinnati, 15.8c.; Indianapolis, 17.9c.; Chicago, 18.9c.; St. Louis, 23.6c.; Kansas City, 43.6c.; Omaha, 43.6c.; St. Paul, 32.9c.; Denver, 68.6c.; New Orleans, 30c.; Birmingham, Ala., 45c.; Pacific coast, 80c. on plates, structural shapes and sheets No. 11 and heavier; 85c. on sheets Nos. 12 to 16; 95c. on sheets No. 16 and lighter; 65c. on wrought pipe and boiler tubes. The foregoing rates to the Pacific coast are by rail. The rate via New York and the Panama Canal has no stability, being dependent on vessel charges.

Plates.—Tank plates, $\frac{1}{4}$ in. thick, $6\frac{1}{4}$ in. up to 100 in. wide, 1.15c. base, net cash, 30 days. Following are stipulations prescribed by manufacturers, with extras:

Rectangular plates, tank steel or conforming to manufacturers' standard specifications for structural steel dated February 6, 1903, or equivalent, $\frac{1}{4}$ in. and over on thinnest edge, 100 in. wide and under, down to but not including 6 in. wide, are base.

Plates up to 72 in. wide, inclusive, ordered 10.2 lb. per sq. ft., are considered $\frac{1}{4}$ -in. plates. Plates over 72 in. wide must be ordered $\frac{1}{4}$ in. thick on edge or not less than 11 lb. per sq. ft., to take base price. Plates over 72 in. wide ordered less than 11 lb. per sq. ft. down to the weight of 3-16 in. take the price of 3-16 in.

Allowable overweight, whether plates are ordered to gauge or weight to be governed by the standard specifications of the Association of American Steel Manufacturers.

Extras	Cents per lb.
Gauges under $\frac{1}{4}$ in. to and including 3-16 in.	10
Gauges under 3-16 in. to and including No. 8	15
Gauges under No. 8 to and including No. 9	25
Gauges under No. 9 to and including No. 10	30
Gauges under No. 10 to and including No. 12	40
Sketches (including straight taper plates), 3 ft. and over	10
Complete circles, 3 ft. in diameter and over	20
Boiler and flange steel	10
"A. E. M. A." and ordinary firebox steel	20
Still bottom steel	30
Marine steel	40
Locomotive firebox steel	50
Widths over 100 in. up to 110 in., inclusive	.05
Widths over 110 in. up to 115 in., inclusive	.10
Widths over 115 in. up to 120 in., inclusive	.15
Widths over 120 in. up to 125 in., inclusive	.25
Widths over 125 in. up to 130 in., inclusive	.50
Widths over 130 in.	1.00
Cutting to lengths under 3 ft. to 2 ft., inclusive	.25
Cutting to lengths under 2 ft. to 1 ft., inclusive	.50
Cutting to lengths under 1 ft.	1.55

No charge for cutting rectangular plates to lengths 3 ft. and over.

Wire Products.—Prices to jobbers. Fence wire, Nos. 0 to 9, per 100 lb., terms 60 days or 2 per cent. discount in 10 days, carload lots, annealed, \$1.35; galvanized, \$1.90. Galvanized barb wire and staples, \$2.10; painted, \$1.60. Wire nails, \$1.55. Galvanized nails, 1 in. and longer, \$1.20 advance over base price; shorter than 1 in., \$1.70 advance over base price. Woven wire fencing, 72

per cent. off list for carloads; 71 off for 1000-rod lots; 70 off for less than 1000-rod lots.

The following table gives the price to retail merchants on fence wire in less than carloads, with the extras added to the base price:

Plain Wire, per 100 lb.

Nos.	0 to 9	10	11	12 & 12½	13	14	15	16
Annealed . . .	\$1.50	\$1.55	\$1.60	\$1.65	\$1.75	\$1.85	\$1.95	\$2.05
Galvanized . . .	2.00	2.05	2.10	2.15	2.25	2.35	2.75	2.85

Wire Rods.—Bessemer, open-hearth and chain rods,
\$25.

Structural Material.—I-beams, 3 to 15 in.; channels, 3 to 15 in.; angles, 3 to 6 in. on one or both legs, $\frac{1}{4}$ in. thick and over, and zees, 3 in. and over, 1.20c. Extras on other shapes and sizes are as follows:

	Cents per lb.
H-beams over 15 in. ....	.10
H-beams over 18 in. ....	.10
Angles over 6 in., on one or both legs. ....	.10
Angles, 3 in. on one or both legs less than $\frac{3}{4}$ in. thick as per steel bar card, Sept. 1, 1909. ....	.70
Tees, structural sizes (except elevator, handrail, car truck and conductor rail) ....	.05
Channels and tees, under 3 in. wide, as per steel bar card, Sept. 1, 1909. ....	.20 to .80
Deck beams and bulb angles ....	.30
Handrail tees ....	.75
Cutting to lengths under 3 ft. to 2 ft. inclusive. ....	.25
Cutting to lengths, under 2 ft. to 1 ft. inclusive. ....	.50
Cutting to lengths, under 1 ft.	1.55
No charge for cutting to lengths 3 ft. and over.	

Wrought Pipe.—The following are the jobbers' car-load discounts on the Pittsburgh basing card in effect from May 1, 1915, all full weight:

Butt Weld					
Steel			Iron		
Inches	Black	Galv.	Inches	Black	Galv.
$\frac{1}{8}$, $\frac{1}{4}$ and $\frac{3}{8}$	72	51 $\frac{1}{2}$	$\frac{1}{8}$ and $\frac{1}{4}$	64	42
$\frac{1}{2}$	76	64 $\frac{1}{2}$	$\frac{1}{2}$	64	42
$\frac{3}{4}$ to 3.....	79	68 $\frac{1}{2}$	$\frac{3}{4}$	68	52
			$\frac{3}{4}$ to 2 $\frac{1}{2}$	71	57
Lap Weld					
2.....	76	65 $\frac{1}{2}$	1 $\frac{1}{2}$	55	41
2 $\frac{1}{2}$ to 6.....	78	67 $\frac{1}{2}$	1 $\frac{1}{2}$	66	52
7 to 12.....	76	65 $\frac{1}{2}$	2.....	67	54
13 and 14.....	62 $\frac{1}{2}$	65 $\frac{1}{2}$	2 $\frac{1}{2}$ to 4.....	69	57
15.....	60	65 $\frac{1}{2}$	4 $\frac{1}{2}$ to 6.....	69	57
			7 to 12.....	67	57
Reamed and Drifted					
1 to 3, butt.....	77	66 $\frac{1}{2}$	1 to 1 $\frac{1}{2}$, butt....	69	55
2, lap.....	74	63 $\frac{1}{2}$	2, butt.....	69	55
2 $\frac{1}{2}$ to 6, lap.....	76	65 $\frac{1}{2}$	1 $\frac{1}{4}$, lap.....	53	39
			1 $\frac{1}{4}$, lap.....	64	50
			2, lap.....	65	52
			2 $\frac{1}{2}$ to 4, lap.....	67	55
Butt Weld, extra strong, plain ends					
$\frac{1}{8}$, $\frac{1}{4}$ and $\frac{3}{8}$	67	54 $\frac{1}{2}$	$\frac{3}{8}$	61	48
$\frac{1}{2}$	72	63 $\frac{1}{2}$	$\frac{1}{2}$	66	56
$\frac{3}{4}$ to 1 $\frac{1}{2}$	76	67 $\frac{1}{2}$	$\frac{3}{4}$ to 1 $\frac{1}{2}$	70	58
2 to 3.....	77	68 $\frac{1}{2}$	2 and 2 $\frac{1}{2}$	71	59
Lap Weld, extra strong, plain ends					
2.....	73	62 $\frac{1}{2}$	1 $\frac{1}{2}$	65	53
2 $\frac{1}{2}$ to 4.....	75	64 $\frac{1}{2}$	2.....	67	54
4 $\frac{1}{2}$ to 6.....	74	63 $\frac{1}{2}$	2 $\frac{1}{2}$ to 4.....	69	57
7 to 8.....	68	57 $\frac{1}{2}$	4 $\frac{1}{2}$ to 6.....	68	56
9 to 12.....	63	52 $\frac{1}{2}$	7 to 8.....	61	51
			9 to 12.....	56	46
Butt Weld, double extra strong, plain ends					
$\frac{1}{2}$	62	53 $\frac{1}{2}$	$\frac{1}{2}$	56	45
$\frac{3}{4}$ to 1 $\frac{1}{2}$	65	56 $\frac{1}{2}$	$\frac{3}{4}$ to 1 $\frac{1}{2}$	59	48
2 to 2 $\frac{1}{2}$	67	58 $\frac{1}{2}$	2 and 2 $\frac{1}{2}$	61	50

To the large jobbing trade an additional 5 per cent. is allowed over the above discounts.

The above discounts are subject to the usual variation in weight of 5 per cent. Prices for less than carloads are two (2) points lower basing (higher price) than the above discounts on black and three (3) points on galvanized.

Boiler Tubes.—Discounts on less than carloads, f.o.b. Pittsburgh, freight to destination added, in effect from May 1, 1915, are as follows:

Lap Welded Steel		Standard Charcoal Iron	
1 and 2 in.	65	1½ and 2 in.	52
2½ in.	62	2½ in.	49
3 in.	61	2½ and 3 in.	46
3½ and 3½ in.	73	3 and 3½ in.	56
4 and 4½ in.	74	3½ and 4½ in.	62
5 and 6 in.	67	5 and 6 in.	56
7 to 13 in.	64		

Locomotive and steamship special charcoal grades bring higher prices.

2 in. and larger, over 22 ft., 10 per cent. net extra.

Sheets.—Makers' prices for mill shipment on sheets of U. S. Standard gauge, in carload and larger lots, on which jobbers charge the usual advance for small lots

from store, as as follows, f.o.b. Pittsburgh, terms 30 days net, or 2 per cent. cash discount in 10 days from date of invoice:

Blue Annealed Sheets	
	Cents per lb.
Nos. 3 to 8.....	1.25 to 1.30
Nos. 9 to 10.....	1.30 to 1.35
Nos. 11 and 12.....	1.35 to 1.40
Nos. 13 and 14.....	1.45 to 1.50
Nos. 15 and 16.....	1.55 to 1.60

Box Annealed Sheets, Cold Rolled	
	Cents per lb.
Nos. 10 and 11.....	1.45 to 1.50
No. 12.....	1.45 to 1.50
Nos. 13 and 14.....	1.50 to 1.55
Nos. 15 and 16.....	1.55 to 1.60
Nos. 17 to 21.....	1.60 to 1.65
Nos. 22 and 24.....	1.65 to 1.70
Nos. 25 and 26.....	1.70 to 1.75
No. 27.....	1.75 to 1.80
No. 28.....	1.80 to 1.85
No. 29.....	1.85 to 1.90
No. 30.....	1.95 to 2.00

Galvanized Sheets of Black Sheet Gauge	
	Cents per lb.
Nos. 10 and 11.....	2.60
No. 12.....	2.70
Nos. 13 and 14.....	2.70
Nos. 15 and 16.....	2.80
Nos. 17 to 21.....	2.95
Nos. 22 and 24.....	3.10
Nos. 25 and 26.....	3.30
No. 27.....	3.45
No. 28.....	3.60

These prices are wholly nominal.

Pittsburgh

PITTSBURGH, PA., May 25, 1915.

A large increase in foreign orders for war materials and a heavier demand for steel products from the domestic trade are holding up operations among the steel mills, which are now at the highest point since last summer. Last week the Carnegie Steel Company operated to 83 per cent. of its ingot capacity and others are running to 75 per cent. or better. In the Youngstown district the three leading companies are operating from 90 to 100 per cent., with a large amount of business ahead. There is more optimism in the steel trade now than at any time for months. The outbreak of war between Italy and Austria and Germany will no doubt result in thousands of Italians leaving this country and going home to bear arms. This will have the effect of increasing the prospects for a serious labor shortage this summer. It will probably be more severely felt in the Connellsville coke region than elsewhere; reports are that in the West Virginia coal fields there is already a shortage of men. As yet none of the material for the Pennsylvania Railroad cars has been actually closed, except 4000 to 5000 tons of the sheets. All the steel car companies that shared in this order are protected on the shapes and plates, but have not yet sent specifications to the mills, as the actual designs of the cars are not yet in their hands. It is probable that the plates for most of the cars will go at about 1.10c., Pittsburgh, as options were given by the mills a good while ago. There has been some movement in basic pig iron, but with very little improvement in prices. Billets and sheet bars are firm and a shortage in supply of open-hearth steel is said to be looming up. Coke is dull, but prices for last half delivery are slightly firmer. There has been some movement in low phosphorus melting scrap, with an advance in price, but other grades are dull.

Pig Iron.—We note a sale of 900 tons of Bessemer by a Shenango Valley interest at \$13.75, at furnace, and this seems to be minimum of the market. A local interest is credited with having bought in the past week or two 40,000 to 50,000 tons of basic for delivery over the next three or four months at about \$12.50, Valley furnace. One leading maker is holding basic iron at \$12.65 minimum at furnace. Foundries are reported to be taking out iron promptly, but there has been no improvement in prices. Some inquiry for foundry iron is in the market for last half delivery, but furnaces are not anxious to sell so far ahead at present prices, and none of this business has been closed. We quote: Bessemer iron, \$13.75; malleable Bessemer, \$12.75; No. 2 foundry, \$12.75 to \$13; basic, \$12.50 to \$12.65, and gray forge, \$12.50, all at Valley furnace, with a freight rate

of 95c. a ton for delivery in the Cleveland and Pittsburgh districts.

Billets and Sheet Bars.—Prices are firm, and if the finishing mills continue to increase their rate of operations, as they have been doing in the past month, a shortage in the supply of open-hearth steel may result. The Carnegie Company has turned down inquiries in the past month for thousands of tons of open-hearth billets and sheet bars, having all it can take care of for three or four months. Prices in the Youngstown district are now close to a parity with Pittsburgh. We note a sale of about 1000 tons of small open-hearth billets at \$22, f.o.b. Pittsburgh, carbons running up to 0.25, which is equivalent to \$21 for 4 x 4-in. We also note sales of 500 to 600 tons of forging billets at \$26, maker's mill, Pittsburgh. We quote Bessemer and open-hearth billets at \$19, and Bessemer and open-hearth sheet bars, \$19.50 to \$20, f.o.b. maker's mills, Youngstown; Bessemer and open-hearth billets, \$20 to \$21, and Bessemer and open-hearth sheet bars, \$21 to \$22, f.o.b. Pittsburgh. Forging billets are quoted at \$26 for sizes up to but not including 10 x 10 in., and for carbons up to 0.25, the regular extras being charged for larger sizes and lighter carbons. Forging billets running above 0.25 to 0.60 carbon take \$1 per ton extra. Axle billets are quoted at \$21 to \$22.

Ferroalloys.—The several cargoes of English ferromanganese that have arrived recently have relieved the situation, and prices for prompt shipment are lower, ranging from \$85 to \$100, depending on conditions. Several carloads were sold last week at \$85 or slightly higher, while \$95 was paid for two or three carloads for spot shipment from stock. The consumption of ferromanganese is heavier than it has been for some months, and it is still believed there will be a shortage in supply later on, especially if the recent war complications should interfere with shipments. We quote English 80 per cent. ferromanganese at \$85 to \$95, delivered, for prompt shipment from stock. We quote 50 per cent. ferrosilicon in lots up to 100 tons, at \$73; over 100 tons to 600 tons, \$72; and over 600 tons, \$71, delivered in the Pittsburgh district. We quote 10 per cent. ferrosilicon at \$17; 11 per cent., \$18; 12 per cent., \$19, all f.o.b. cars at furnace, Ashland, Ky., Jackson or New Straitsville, Ohio, each of these points having a rate to Pittsburgh of \$2 per gross ton. We quote 20 per cent. spiegeleisen at \$25 at furnace. We quote ferrotitanium at 8c. per lb. in carloads, 10c. in 2000-lb. lots and over, and 12½c. in smaller lots.

Structural Material.—Inquiry is reported better and several good jobs have been placed. The Jones & Laughlin Steel Company has taken the Hamilton County court house at Cincinnati, 3000 tons; the McClintic-Marshall Company, about 1100 tons for girder bridges for the Pennsylvania Railroad, 900 tons for additional work for the Scovill Mfg. Company, Waterbury, Conn., and about 600 tons for coke storage bins for the Republic Iron & Steel Company, Youngstown; the Riter-Conley Mfg. Company, 1900 tons for pier No. 18, Balboa terminal, Panama Canal, and 700 tons for the Calumet & Hecla Mining Company, Calumet, Mich., for a leaching building; the Fort Pitt Bridge Works, 750 tons of bridge work for the Pennsylvania Railroad. Bids went in May 25 for 600 tons additional for this road. We quote beams and channels up to 15-in. at 1.20c. for May and June delivery, and 1.25c. for third quarter. On specific work for prompt shipment, it is probable these prices would be slightly shaded.

Steel Rails.—As yet the Pennsylvania Railroad order for 138,000 tons has not come out, but it is looked for at any time. The new demand for light rails is quite active, the Carnegie Company having received new orders and specifications the past week for close to 3000 tons. We quote standard section rails of Bessemer stock at 1.25c., and of open-hearth, 1.34c., f.o.b. Pittsburgh. We quote light rails as follows, in carload lots: 8 and 10 lb. section, 1.275c.; 12 and 14 lb., 1.225c.; 16 and 20 lb., 1.175c.; 25, 30, 35, 40 and 45 lb. sections, 1.125c. The prices of light rails are materially shaded on large lots.

Plates.—The Pennsylvania Railroad has further given out contracts for 133 passenger cars. The Pressed Steel Car Company took 47; the Standard Steel Car Company, 39; Pullman Company, 12; American Car & Foundry Company, 20, and J. G. Brill Company, 15. It is also announced that the railroad will build 40 all-steel passenger cars at its own shops at Altoona. The expected order of the Rock Island road for 5000 cars has been held up temporarily. The Pressed Steel Car Company has taken 100 X L box cars for the Long Island Railroad. The mills report the general demand for plates as moderately active, but conditions will be better as soon as car specifications are received. The Riter-Conley Mfg. Company has taken a contract for 8 sand-bleaching tanks and 18 solution tanks for the Calumet & Hecla Mining Company, Calumet, Mich., which will require 800 tons of plates, to be furnished by a Pittsburgh mill. We quote $\frac{1}{4}$ -in. and heavier plates for May and June delivery at 1.15c. to 1.20c., f.o.b. Pittsburgh.

Sheets.—As the price of spelter continues to climb, some sheet mills are not quoting on galvanized sheets, while others are quoting to regular customers only and for spot shipment. The price of the American Sheet & Tin Plate Company for No. 28 galvanized is still 3.60c., but only to regular customers and for prompt delivery, this company having in a few cases protected customers at this price up to July where conditions demanded it. Mills that are not quoting on galvanized sheets are going after business in black sheets more vigorously, and 1.75c. on No. 28 Bessemer black has been done lately for prompt delivery. Specifications for sheets in the past two weeks have been the heaviest in any similar period for a very long time. We quote No. 28 Bessemer black sheets at 1.75c. to 1.85c.; No. 28 galvanized, 3.60c. to 3.75c.; Nos. 9 and 10 blue annealed sheets, 1.30c. to 1.35c.; No. 30 black plate, tin-mill sizes, H. R. & A., 1.95c.; No. 28, 1.90c.; Nos. 27, 26 and 25, 1.85c.; Nos. 22 to 24, 1.80c.; Nos. 17 to 21, 1.75c.; Nos. 15 and 16, 1.70c. The above prices are for carload lots, f.o.b. at maker's mill, jobbers charging the usual advances for small lots from store.

Tin Plate.—Several mills state that specifications against contracts for tin plate from the can makers have come in better the past week and they now have work ahead for three or four weeks. The American Sheet & Tin Plate Company has taken a contract from the Standard Oil Company for about 200,000 boxes for making oil cans, for delivery over the next six months. The new demand is reported more active and the aggregate of new business being placed is quite heavy. On new orders we quote 14 x 20 coke plates at \$3.15 to \$3.25 per base box, but on a desirable order this price would be shaded.

Wire Rods.—In the past week or two orders for 4000 to 5000 tons of open-hearth wire rods have been taken by local mills for export. It is said they netted \$26, Pittsburgh, which is about \$1 per ton higher than the domestic market. A leading mill reports it is practically sold up for the remainder of the year. We quote Bessemer, open-hearth and chain rods at \$25 to \$25.50 for domestic business.

Carwheels.—As yet none of the orders for carwheels for the new freight cars of the Pennsylvania Railroad has been placed, but negotiations are on between the car-wheel makers and the steel car companies. It is said that forged steel wheels will be used on the cars for the Lines East and cast-iron wheels for the Lines West. We quote standard 33-in. freight carwheels 6 $\frac{1}{4}$ in. rough bore at \$16, and standard 36-in. passenger, the same bore, at \$22.50 per wheel, f.o.b. Pittsburgh.

Shafting.—Prices are firmer and practically all the makers of shafting are now quoting 68 per cent. off on the new list in carload and larger lots for forward delivery. Specifications from the automobile and machine-tool trades are heavy, but from the implement makers are still light. The shafting works of the Republic Iron & Steel Company has started up after being idle for some time. We quote cold-rolled shafting at 68 per cent. off in carload and larger lots, and 63 per cent. in small lots, f.o.b. Pittsburgh. On an order of very desirable specifications for prompt shipment possibly one or two makers would name 70 per cent.

Railroad Spikes.—Specifications from railroads against contracts are coming in more freely. No word has been heard from the inquiry from Russia for 60,000 to 80,000 kegs of spikes, and some in the trade believe nothing will come of it. We quote standard railroad spikes at \$1.35 to \$1.40; small railroad and boat spikes, \$1.45 to \$1.50 in carload and larger lots per 100 lb., f.o.b. Pittsburgh.

Hoops and Bands.—New orders for both hoops and bands are coming in more freely, and specifications against contracts are heavier. Quite large shipments of hoops have been made to the Pacific coast to cooperate plants that furnish packages for the wine dealers in that section. We quote steel bands at 1.20c. for June delivery; 1.25c. for third quarter, with extras as per the steel bar card, and steel hoops at 1.25c., f.o.b. Pittsburgh.

Skelp.—Some foreign inquiry has come up that is now being figured on by several local mills. Prices are firm and, with the increasing cost of raw materials, may be higher in the near future. We quote grooved steel skelp, 1.15c.; sheared steel skelp, 1.20c.; grooved iron skelp, 1.50c. to 1.55c.; sheared iron skelp, 1.60c. to 1.65c., delivered to consumers' mills in the Pittsburgh district.

Wire Products.—Fairly heavy export orders for barb and plain wire are being placed with local mills and are taking a good part of their output. The domestic demand for wire nails is quiet, as the buying season is pretty well over, but for plain and barb wire and wire fencing orders are still quite heavy. Local wire mills are using great caution in selling galvanized wire, and are insisting on the full differential, in some cases asking more. To jobbers, on new orders, the mills quote wire nails, \$1.55; galvanized nails, 1 in. and longer, taking an advance over this price of \$1.20, or \$2.75, and shorter than 1 in. an advance of \$1.70, or \$3.25; plain annealed wire, \$1.35; galvanized barb wire and fence staples, \$2.10 to \$2.20; painted barb wire, \$1.60, all f.o.b. Pittsburgh, freight added to point of delivery, terms 30 days net, less 2 per cent. for cash in 10 days. We quote woven wire fencing at 72 per cent. off in carload lots, 71 per cent. off on 1000-rod lots and 70 per cent. on small lots, f.o.b. Pittsburgh.

Iron and Steel Bars.—The implement makers are still holding off placing their season contracts for steel bars, as the mills are reported to stand firmly at 1.20c. for last half. The demand for steel rounds for shrapnel purposes is enormously heavy, the Carnegie Company being credited with taking 20,000 to 25,000 tons the past week. The steel-bar mills in this district are operating to full capacity and in some cases are back in orders three to four weeks. Prices on steel bars are 1.20c. for May and June and 1.25c. for third quarter. The demand for common iron bars is looking up, and prices are firmer. We quote common iron bars 1.20c. to 1.25c., and test iron bars, 1.30c., f.o.b. Pittsburgh.

Cold-Rolled Strip Steel.—As yet the inquiry from Canada for about 6000 tons of cold-rolled steel for shipment to the Allies has not been closed. The domestic demand is more active, prices are firm and makers report specifications coming in freely. We quote hard-rolled steel, 1 $\frac{1}{2}$ in. and wider, under 0.20 carbon, sheared or natural mill edges, per 100 lb., \$2.75, delivered. Extras, which are standard among all the mills, are as follows:

Thickness, in.	Extras for thickness	Extras for soft or intermediate tempers	Extras for straightening and cutting to lengths not less than 24 in.
0.100 and heavier.....	Base	\$0.25	\$0.10
0.099 to 0.050.....	\$0.05	0.25	0.15
0.049 to 0.035.....	0.20	0.25	0.15
0.034 to 0.031.....	0.35	0.40	0.25
0.030 to 0.025.....	0.45	0.40	0.40
0.024 to 0.020.....	0.55	0.40	0.50
0.019 to 0.017.....	0.85	0.50	1.10
0.016 to 0.015.....	1.25	0.50	1.10
0.014 to 0.013.....	1.95	0.50	1.25
0.012.....	2.30	0.50	coils only
0.011.....	2.65	0.50	coils only
0.010.....	3.00	0.50	coils only

Merchant Steel.—The new demand is more active, and mill shipments in May will be heavier than in any one month for some time. Prices are firm. On small lots we quote: Iron finished tire, $\frac{1}{2}$ x 1 $\frac{1}{2}$ in. and larger, 1.30c., base; under $\frac{1}{2}$ x 1 $\frac{1}{2}$ in., 1.45c.; planished tire,

1.50c.; channel tire, $\frac{3}{4}$ to $\frac{7}{8}$ and 1 in., 1.80c. to 1.90c.; $1\frac{1}{2}$ in. and larger, 1.90c.; toe calk, 1.90c. to 2c., base; flat sleigh shoe, 1.65c.; concave and convex, 1.70c.; cutter shoe, tapered or bent, 2.20c. to 2.30c.; spring steel, 1.90c. to 2c.; machinery steel, smooth finish, 1.70c.

Rivets.—The demand for structural and boiler rivets is improving, but as yet prices have shown little or no betterment. We quote structural rivets at \$1.40 to \$1.45, and conehead boiler rivets at \$1.50 to \$1.55 per 100 lb., in carload lots, f.o.b. Pittsburgh.

Nuts and Bolts.—The demand is heavier, and in connection with the higher cost of steel bars an early advance is expected. A number of nut and bolt makers are in session in this city to-day considering the situation. Discounts to the large trade are as follows:

U. S. S. Cold Punched Blank and Tapped, Chamfered, Trimmed and Reamed

$\frac{1}{2}$ in. and smaller, hex. 8.1c. per lb. off
 $\frac{3}{8}$ in. and larger hex. 7.3c. per lb. off
 Square, all sizes 5.8c. per lb. off

Semi-Finished Tapped

$\frac{1}{2}$ in. and smaller hex. 85-10-10 off
 $\frac{3}{8}$ in. and larger hex. 85-10-10 off

Black Bulk Rivets

$7/16 \times 6\frac{1}{2}$, smaller, and shorter 80-10-5 off

Package Rivets 1000 Pcs.

Black, metallic tinmed and tin plated 75-10-10 off

Wrought Pipe.—New orders for tubular goods have been heavier this month than for some time, the actual orders sent to the mills for rolling by one leading interest being more than 80 per cent. of its capacity. Other makers report business more active. The LaBelle Iron Works, Steubenville, Ohio, has taken a contract for 50 miles of 8-in. and about 10 miles of other sizes of line pipe for shipment to the Oklahoma gas territory. Discounts on iron and steel pipe, printed on a previous page, are firmly held.

Boiler Tubes.—The tubes for the locomotives to be built for the Pennsylvania Railroad have not yet been placed. The current demand for locomotive and merchant tubes is slightly better, but regular discounts are still being more or less shaded.

Old Material.—About the only movement in the local scrap trade is in low phosphorus melting stock, the demand for which has been heavy for the past two or three weeks, and prices have advanced fully \$1 per ton. A leading consumer in this district is said to be offering \$11.75, delivered, for selected heavy steel melting scrap, but another large consumer is filled up and out of the market. Dealers are looking for higher prices before long, as the visible supply is low and consumption is rapidly increasing. We note a sale of about 1000 tons of low phosphorus melting stock at slightly above \$15, delivered. For delivery in Pittsburgh and nearby districts that take Pittsburgh freights, dealers quote about as follows:

Heavy steel melting scrap, Steubenville, Follansbee, Brackenridge, Sharon, Monessen, Midland and Pittsburgh delivery	\$11.75
Compressed side and end sheet scrap	\$10.25 to 10.50
No. 1 foundry cast	12.00 to 12.25
Bundled sheet scrap, f.o.b. consumers' mills, Pittsburgh district	9.25 to 9.50
Rerolling rails, Newark and Cambridge Ohio, Cumberland, Md., and Franklin, Pa.	11.75 to 12.00
No. 1 railroad malleable stock	10.50 to 10.75
Railroad grate bars	8.50 to 8.75
Low phosphorus melting stock	15.00 to 15.25
Iron car axles	18.75 to 19.25
Steel car axles	13.25 to 13.75
Locomotive axles, steel	19.75 to 20.25
No. 1 busheling scrap	10.50 to 10.75
No. 2 busheling scrap	7.50 to 7.75
Machine shop turnings	7.75 to 8.00
Old carwheels	11.75 to 12.00
Cast-iron borings	8.25 to 8.50
*Sheet bar crop ends	12.00 to 12.25
Old iron rails	12.75 to 13.00
No. 1 railroad wrought scrap	10.75 to 11.00
Heavy steel axle turnings	8.50 to 8.75
Heavy breakable cast scrap	10.75 to 11.00

*Shipping point.

Coke.—Prices on furnace coke for last half delivery are firmer. One or two inquiries are in the market for furnace coke for last half. The demand for spot coke is dull. The ovens of the H. C. Frick Coke Company will operate six days this week and probably next week. The Connellsville Courier reports the output of coke

in the upper and lower Connellsville regions for the week ended May 15 as 297,554 net tons, a decrease over the previous week of about 1600 tons. A serious shortage in labor supply is facing the coke makers, which has been aggravated by the declaration of war by Italy, as Italian labor is largely employed in the coke regions. We quote best grades of furnace coke for delivery over the remainder of the year at \$1.65 to \$1.75, and for spot shipment \$1.50 per net ton at oven. We quote standard makes of 72-hr. foundry coke for prompt shipment at \$1.90 to \$2.25, and on contracts for remainder of the year, from \$2.15 up to \$2.50 per net ton at oven.

Chicago

CHICAGO, ILL., May 26, 1915.—(By Wire.)

Steel mill operations in this district are now at a rate of about 70 per cent. of capacity. The merchant bar mills are doing better than this but plate mills considerably less. At the Gary works of the Illinois Steel Company the blowing in of the seventh blast furnace is balanced by changing over one furnace at South works from iron to ferromanganese. The week's showing in steel orders was saved from retrogression by reason of abnormal export business placed here, including a round tonnage of billets and sheet bars for Great Britain and bars and plates for the Orient. The exigencies of ocean shipping are such that the location of the port of sailing of available vessels dictates the place of rolling. Chicago is exporting to Europe, via Gulf ports. Recent rollings of billets have also been made at Chicago for delivery in the Pittsburgh district to relieve local mills overtaxed in some departments. The booking of two lots of rails and the placing of the orders for beams, channels and plates for the Chicago & Northwestern Railroad cars contributed to the week's total of specifications. Decidedly greater freedom is evidenced in the buying of bars than other products, including steel for cars, reinforced construction and agricultural implements. The making of implement bar contracts is progressing but slowly. Thus far makers have been able to limit contract deliveries within six months and the price of 1.20c., Pittsburgh, appears to gather strength. Galvanized sheet quotations continue to follow the ascension of spelter prices. Pig-iron sales quite generally involve less than 1000 tons, with lots of a few hundred tons most common. The steadiness with which iron is being taken in by the melters and many evidences that purchases have been made to cover business already secured have injected into the pig-iron trade some elements of strength which have been long absent.

Pig Iron.—A sale of 1000 tons and another of 1500 tons appear to be exceptions to the run of pig-iron purchases last week, the majority of which were under 500 tons. Of the latter, the number is distinctly satisfactory, the more so because in most instances the buying appears to cover orders already on the books, thus lending assurance of the prompt delivery of the iron. Local furnaces have been the more favored beneficiaries of recent buying, the advantage of price being largely with Lake iron as against the South. Northern furnaces are adhering to the \$13 quotation and in most cases are securing the accepted differentials for grades. The attitude of Southern producers is making for added firmness and \$9.75, Birmingham, is now a general minimum. Added capacity will shortly be in blast in the South. Malleable iron is in but slight demand. The following quotations are for iron delivered at consumers' yards, except those for Northern foundry, malleable Bessemer and basic iron, which are f.o.b. furnace, and do not include a switching charge averaging 50c. a ton:

Lake Superior charcoal, Nos. 2 to 5	\$15.75
Lake Superior charcoal, No. 1	16.25
Lake Superior charcoal, No. 6 and Scotch	16.75
Northern coke foundry, No. 1	\$13.50 to 13.75
Northern coke foundry, No. 2	13.00 to 13.50
Northern coke foundry, No. 3	12.50 to 13.00
Southern coke, No. 1 f'dry and 1 soft	14.00 to 14.25
Southern coke, No. 2 f'dry and 2 soft	13.50 to 14.00
Malleable Bessemer	13.00 to 13.25
Standard Bessemer	16.50
Basic	12.50 to 13.00
Low phosphorus	20.00 to 20.50
Jackson Co. and Ky. silvery, 8 per cent.	16.50 to 17.00
Jackson Co. and Ky. silv'y, 10 per cent.	17.50 to 18.00

(By Mail)

Rails and Track Supplies.—Rail business entered very largely into the week's bookings, including a substantial purchase by one of the trunk lines east of Chicago and a lot of 4000 tons which will enter into a 100-mile extension of the lines of the Chesapeake & Ohio. The placing of that portion of the Pennsylvania rails which are likely to be rolled in the West has not yet been announced. We quote standard railroad spikes at 1.45c. to 1.50c., base; track bolts with square nuts, 1.90c., base, all in carload lots, Chicago; tie plates, \$23.25 to \$24.25, f.o.b. mill, net ton; standard section Bessemer rails, Chicago, 1.25c., base; open-hearth, 1.34c.; light rails, 25 to 45 lb., 1.07c.; 16 to 20 lb., 1.12c.; 12 lb., 1.17c.; 8 lb., 1.22c.; angle bars, 1.50c., Chicago.

Structural Material.—The somewhat belated placing of orders for the steel entering into the 2000 cars to be built by the Western Steel Car & Foundry Company for the Chicago & Northwestern Railroad constituted the important structural business of the week and included exceedingly desirable specifications for beams and channels approximating 10,000 tons. Specifications covering more recent car orders secured by Western builders, the rolling of which is assured to local mills, have not yet been placed. For bridge and architectural work the buying has been limited to small jobs, but of these there has been rather a larger number than for some weeks. The bascule bridge at East Chicago, mention of which has been previously made, calls for 312 tons and went to the Penn Bridge Company. The Turnblad building at Minneapolis, calling for 222 tons, and highway bridges in Yellowstone County, Mont., involving 325 tons, have been placed. The mills continue very desirous of specifications that run into tonnage and for such business concessions of \$1 per ton have been made, but for small lots we continue to quote for Chicago delivery from mill 1.389c.

Aside from the business emanating from the strictly city trade, local jobbers report the number of orders for structural material increasing, but there is no great improvement in the aggregate tonnage. We quote for Chicago delivery of structural shapes out of shop 1.75c.

Plates.—The booking of several thousand tons of plates, the larger portion for car work, but including a fair amount of tank steel and plate for riveted pipe, has somewhat improved the local mill situation. The weakness in prices persists, and we quote for Chicago delivery of plates from mill 1.289c. to 1.339c.

We quote for Chicago delivery of plates out of stock 1.75c.

Sheets.—The leading independent maker of galvanized sheets has more positively affirmed its quotation of 4c., Pittsburgh, for No. 28, in contrast to the otherwise quite general advance to 3.60c. The accumulation of black sheets, of which there has been an excessive production, in order to keep the mills going, is being manifested in the low quotations that are appearing, and shading of our quotation of 1.75c., Pittsburgh, is not uncommon. We quote for Chicago delivery from mill: No. 10 blue annealed, 1.489c.; No. 28 black, 1.889c. to 1.939c.; No. 28 galvanized, 3.589c. to 3.789c.

We quote for Chicago delivery from jobbers' stocks as follows, minimum prices applying on bundles of 25 or more: No. 10 blue annealed, 1.95c.; No. 28 black, 2.55c.; No. 28 galvanized, 4c.

Bars.—The implement bar situation is developing very slowly and with a singular lack of headway in any definite direction. The firmness with which the mills are adhering to the price of 1.20c., Pittsburgh, and to their refusal to take business for delivery beyond January 1 appears to be having its effect. While no great amount of business has been placed, contracts thus far made specify deliveries within the last half, and some are for three months only. In fact, the pessimistic attitude of the implement interests is borne out by their hand-to-mouth buying. Reports are made of contracts for implement bars running through to July 1, 1916, at an advance of \$1 per ton after January 1, but explicit confirmation is lacking. There is a fair business in reinforcing bars, including one lot for a local freight terminal involving 800 tons. Bar-iron orders are few and far apart. We quote for mill shipments as follows: Bar iron, 1.15c. to 1.20c.; soft steel

bars, 1.389c.; hard steel bars, 1.20c.; shafting, in carloads, 65 to 68 per cent. off; less than carloads, 60 per cent. off.

We quote store prices for Chicago delivery: Soft steel bars, 1.65c.; bar iron, 1.65c.; reinforcing bars, 1.65c. base, with 5c. extra for twisting in sizes $\frac{1}{2}$ in. and over and usual card extras for smaller sizes; shafting 60 per cent. off, and in carloads, 62 per cent. off.

Rivets and Belts.—Negotiations in connection with the placing of contracts for bolts and nuts by the implement interests are under way, but as yet few, if any, contracts have been made. Bolt makers appear disposed to follow a policy in parallel with the selling terms for semi-finished material, but the basis for contracts has not yet been developed. Quotations are as follows: Carriage bolts up to $\frac{3}{8}$ x 6 in., rolled thread, 80-15; cut thread, 80-10; larger sizes, 75-17 $\frac{1}{2}$; machine bolts up to $\frac{3}{8}$ x 4 in., rolled thread, 80-20; cut thread, 80-15; larger sizes, 80 x 2 $\frac{1}{2}$; coach screws, 85-2 $\frac{1}{2}$; hot pressed nuts, square, \$6.60 to \$6.40 off per cwt.; hexagon, \$7.60 to \$7.30 off per cwt. Structural rivets, $\frac{3}{4}$ to 1 $\frac{1}{4}$ in., 1.35c. to 1.45c., base, Chicago, in carload lots; boiler rivets, 10c. additional.

We quote out of store: Structural rivets, 2c.; boiler rivets, 2.10c.; machine bolts up to $\frac{3}{8}$ x 4 in., 75-15; larger sizes, 70-10-10; carriage bolts up to $\frac{3}{8}$ x 6 in., 75-10; larger sizes, 70-15 off; hot pressed nuts, square, \$6, and hexagon, \$6.70 off per cwt.

Wire Products.—With the passing of the spring season of selling, the wire trade is beginning to take on a quieter aspect, and such new business as can be secured is likely to be taken on the basis of commensurate concessions. For wire nails 1.55c., Pittsburgh, is now the ruling quotation. There is very little activity in fencing. We quote to jobbers as follows: Plain wire, No. 9 and coarser, base, \$1.589; wire nails, \$1.739 to \$1.789; painted barb wire, \$1.789; galvanized barb wire, \$2.289 to \$2.389; polished staples, \$1.789; galvanized staples, \$2.289 to \$2.389, all Chicago.

Old Material.—The scrap market makes progress with no very certain steps. The state of the market wavers between firmness and weakness with each passing indication of the trend of business. Buying and selling are on a very limited scale, and the spread between buyers' and sellers' prices is very narrow. The demand for the heavier grades of rolling-mill scrap is relatively prominent, while the scarcity of cast borings, resulting both from the limited quantity being manufactured and the use of borings for briquettes, accentuates the demand for this item. Railroad lists now out for figures include 2000 tons from the St. Paul, 2500 tons from the Santa Fé, and 4700 tons from the Rock Island. We quote for delivery at buyers' works, Chicago and vicinity, all freight and transfer charges paid, as follows:

Per Gross Ton	
Old iron rails	\$12.25 to \$12.50
Old steel rails, rerolling	10.25 to 10.75
Old steel rails, less than 3 ft.	10.00 to 10.50
Old carwheels	9.75 to 10.25
Heavy melting steel scrap	9.50 to 9.75
Frogs, switches and guards, cut apart	9.50 to 9.75
Shoveling steel	9.00 to 9.25
Steel axle turnings	7.00 to 7.25

Per Net Ton	
Iron angles and splice bars	\$11.50 to \$12.00
Iron arch bars and transoms	12.00 to 12.50
Steel angle bars	8.50 to 8.75
Iron car axles	13.75 to 14.00
Steel car axles	10.50 to 11.00
No. 1 railroad wrought	9.00 to 9.50
No. 2 railroad wrought	8.25 to 8.75
Cut forge	8.25 to 8.75
Steel knuckles and couplers	8.50 to 8.75
Steel springs	9.00 to 9.25
Locomotive tires, smooth	8.50 to 9.00
Machine shop turnings	5.50 to 5.75
Cast borings	5.00 to 5.50
No. 1 busheling	7.50 to 7.75
No. 2 busheling	6.50 to 6.75
No. 1 boilers, cut to sheets and rings	5.50 to 6.00
Boiler punchings	8.25 to 8.50
No. 1 cast scrap	9.00 to 9.25
Stove plate and light cast scrap	8.00 to 8.25
Grate bars	7.50 to 7.75
Railroad malleable	8.25 to 8.50
Agricultural malleable	7.25 to 7.50
Pipes and flues	6.50 to 6.75

Cast-Iron Pipe.—The city of Chicago will buy this week 2300 tons of 16 and 24 in. pipe, but this is the only business of moment immediately available. Inquiries are expected from St. Louis and Cincinnati.

Last week saw the placing of a number of small orders, but even the routine tonnage was curtailed. We quote as follows, per net ton, Chicago: Water pipe, 4 in., \$25.50; 6 to 12 in., \$23.50; 16 in. and up, \$23, with \$1 extra for gas pipe.

Philadelphia

PHILADELPHIA, PA., May 25, 1915.

The recent placing of car orders by the Pennsylvania Railroad and to a lesser extent by other railroads, and the subsequent placing of orders for the necessary materials, have imparted a decidedly optimistic tone to the steel situation and this will be more than ever the case when the Pennsylvania's rail orders are distributed. It is understood they will come out this week. Entire satisfaction is not expressed over the purchasing of the materials referred to, for some of the independent companies say that prices were made, especially for plates, which they did not care to meet. Options were in force which they had not taken into consideration. The tonnage of general products booked in the week is fully up to, if not greater, than that of preceding weeks, even with those who did not share in the railroad business. The possibility of serious complications with Germany and Italy's entrance into the war seem to be having little or no effect on the situation. Inquiry for shrapnel bars continues a factor. The quotations for bars and shapes hold up, though new business in both is quiet. The purchasing of small lots of foundry pig iron continues at a good pace, but activity in steel-making iron is lacking. For ferromanganese \$100 has been asked. Old materials are dull and heavy melting steel scrap is lower.

Iron Ore.—Arrivals in the week ended May 22 comprise 6745 tons from Sweden and 2000 tons from New Brunswick, Canada. There is no demand, as far as new contracts are concerned.

Pig Iron.—The Norfolk & Western Railroad has placed orders for its last half requirements of about 4000 tons of miscellaneous grades. Contracts for foundry iron were placed with two Virginia furnaces and for malleable Bessemer and charcoal iron with Ohio furnaces. Full prices are said to have been paid. The demand of the week was as good as in previous weeks and probably a trifle better. The call for Virginia iron keeps up in a satisfactory way and the good showing of last month will be equaled. The bulk of business is made up of small lots. Prices are practically unchanged and generally firm, though the statement is made by an important seller that the market is still more or less in the control of the buyers. There is a common belief that, with prices where they are, the present is a good time to buy and it is because of a realization of this that consumers are buying. Some of them are anticipating their requirements. Cast-iron pipe makers have taken 6000 or 8000 tons of low grade iron. Basic is inactive, except for a few inquiries for moderate-sized lots in which price is a determining factor to an even greater extent than is usual. The demand for standard low phosphorus is pursuing a routine course at full prices, but not much is coming into this territory. In scattered lots 1700 tons of Lebanon low phosphorus has been taken. Quotations for standard brands for early delivery in buyers' yards in this district are as follows:

Eastern Penna. No. 2 X, foundry.....	\$14.25 to \$14.50
Eastern Penna. No. 2 plain.....	14.00 to 14.25
Virginia, No. 2 X, foundry.....	15.25 to 15.75
Virginia No. 2 plain.....	15.00 to 15.25
Gray forge.....	13.25 to 13.50
Basic.....	13.25 to 13.75
Standard low phosphorus.....	20.00 to 20.50

Ferroalloys.—Quotations on 80 per cent. ferromanganese and the acceptance of orders are subject to cabled confirmation from abroad. Only future deliveries are available. The quantity which recently arrived is not nearly sufficient to take care of existing contracts. In a few cases where English producers have been disposed to authorize quotations, \$100, seaboard, has been named as the price. The inquirers made counter offers and little, if any, business resulted. The producers are not eager to sell. For 50 per cent.

ferrosilicon the quotations are \$71 to \$73, Pittsburgh, according to quantity.

Bars.—Specifications for steel bars are holding up in a satisfactory way, but new business is not important as regards volume. Inquiries for shrapnel rounds continue to absorb the interest of the trade, but definite statements as to their aggregate are not easily obtainable. The Bethlehem Steel Company, which was referred to last week as in the market for 10,000 tons, has sent out a supplementary inquiry which includes annealing of the bars and specifies delivery at the rate of 1000 tons per month. The quotation for the remainder of this quarter is unchanged at 1.359c., Philadelphia, for steel bars. For shrapnel rounds, over and under 2c. has been quoted. With one company 1.90c., delivered, is the minimum, but quotations show a tendency to drop. Iron bars are quoted at 1.17½c. to 1.20½c., Philadelphia.

Plates.—Consumers have made an effort to get plates on the basis of 1.10c., Pittsburgh, or 1.259c., Philadelphia, but local makers have declined the business. It would have been accepted at from 1.309c. to 1.359c., Philadelphia. Some disappointment is expressed over the prices offered for car plates by companies who have taken contracts from the Pennsylvania Railroad for freight cars. At least one local company let the business go by. Surprise is expressed also over the long life of certain options which it was supposed were about exhausted. The aggregate of miscellaneous orders has continued rather good. The American Bridge Company was awarded the subway extension in Brooklyn and the 5800 tons of plates required will go to the large interest, which will also supply plates for two passenger steamships to be built by the William Cramp & Sons Ship & Engine Building Company. The ships were ordered by the Mexican Navigation Company and are to cost \$800,000.

Rails.—The Pennsylvania Railroad is expected to place orders about the middle of this week.

Structural Material.—Some local business, mostly in the form of additions to buildings, is projected, but they have not yet taken definite form. The Pennsylvania Railroad has inquiries out for about 1000 tons of bridge work. The Eastern Steel Company will supply shapes to the American Car & Foundry Company for Pennsylvania Railroad freight cars. An independent shop will supply about 400 tons of steel for a factory building at Camden, N. J., for the Victor Talking Machine Company. General conditions are quiet in this territory, although the merchant demand shows some improvement. The quotation is unchanged at 1.359c., Philadelphia, for this quarter, but a large tonnage would be likely to bring out a lower price.

Sheets.—The improvement previously noted continues, but the demand is in no way exceptional. Quotations are unchanged at 1.459c. to 1.509c., Philadelphia, for No. 10 blue annealed.

Billets.—More inquiry is developing for long term contracts, but the makers are not anxious to tie themselves up for too long a time. They look for an increase in both domestic and foreign business. Some makers report a better business at slightly higher prices. The quotation for open-hearth rolling billets is \$22.02, Philadelphia, with forging steel running \$4 to \$5 per ton higher.

Coke.—Dealers here have closed practically all of their contracts for foundry coke and the market is quiet. The demand for furnace coke is quiet also. Quotations for prompt furnace coke range from \$1.55 to \$1.60 per net ton at oven, but contract is firm at \$1.75. Prompt foundry is quoted at \$2 to \$2.40 and contract foundry at \$2.20 to \$2.50. Freight rates from the principal producing districts are as follows: Connellsville, \$2.05; Latrobe, \$1.85, and Mountain, \$1.65.

Old Material.—In a dull market the quotation for heavy melting steel scrap is easier and the range is now approximately \$11 to \$11.25. Business has been done at both figures, but not a great deal. No. 1 cast scrap is a little more active. There has been another small sale of old steel axles for export. Quotations are unchanged except in the case of heavy melting steel. Quotations for delivery in buyers' yards in this dis-

trict, covering eastern Pennsylvania and taking freight rates from 35c. to \$1.35 per gross ton, are as follows:

No. 1 heavy melting steel.....	\$11.00 to \$11.25
Old steel rails, rerolling.....	11.50 to 12.00
Low phos. heavy melting steel scrap.....	14.50 to 14.75
Old steel axles.....	14.00 to 14.50
Old iron axles.....	17.50 to 18.00
Old iron rails.....	15.00 to 15.50
Old carwheels.....	11.50 to 12.00
No. 1 railroad wrought.....	13.00 to 13.25
Wrought-iron pipe.....	10.75 to 11.00
No. 1 forge fire.....	8.00 to 8.50
Bundled sheets.....	9.00 to 9.50
No. 2 busheling.....	7.75 to 8.25
Machine shop turnings.....	8.50 to 8.75
Cast borings.....	8.00 to 8.25
No. 1 cast.....	12.25 to 12.50
Grate bars, railroad.....	9.00 to 9.25
Stove plate.....	9.00 to 9.25
Railroad malleable.....	9.50 to 10.00

Buffalo

BUFFALO, N. Y., May 25, 1915.

Pig Iron.—The market is dull, most users having covered for some time ahead in the recent heavy buying movement. Shipments of iron on contracts, however, are increasing and show a noticeable improvement in consumption in some sections of tributary districts, with a more optimistic feeling pervading the foundry trade in general. Some users are anticipating their contract quotas as far ahead as July. The Canadian demand for iron under contract is also improving. The Canadian Furnace Company, Port Colborne, is now shipping practically to the capacity of the stack. The Lackawanna Steel Company is taking hot metal directly from the Rogers-Brown Iron Company's furnaces on its old contract. We continue to quote as follows, for current quarter and last half delivery, f.o.b. furnace, Buffalo:

No. 1 foundry.....	\$13.25 to \$13.50
No. 2 X foundry.....	13.00 to 13.25
No. 2 plain.....	12.75 to 13.00
No. 3 foundry.....	12.50 to 12.75
Gray forge.....	12.50
Malleable.....	13.00 to 13.25
Basic.....	13.25 to 13.75
Charcoal, regular grades and analysis.....	15.75 to 17.25
Charcoal, special grades and analysis.....	19.00 to 20.00

Finished Iron and Steel.—Most selling agencies report market conditions brightening. Bar specifications are gaining on shipments with some users calling for earliest shipment at mill's convenience. This indicates a noticeable increase in consumption. A good many buyers are making inquiries for third quarter and last half and some producing interests are closing a few contracts for such delivery. It is reported that in some instances business with delivery extending through last half has been taken at 1.25c., Pittsburgh. The Lackawanna Steel Company has received a heavy order for large rounds from the Brooks plant of the American Locomotive Company at Dunkirk. It is stated that the Lackawanna Company is now operating to between 70 and 80 per cent. of capacity. Considerable business in railroad track material, tie plates, etc., is also reported as placed. The continued advance in spelter is causing some manufacturers to withdraw from the market on galvanized wire products, as far as contracting into the future is concerned, sales representatives being instructed to submit specifications before quoting. The increased cost of spelter is also affecting mills manufacturing galvanized sheets. Bids are being taken for 250 tons of structural steel for an addition to the Union Carbide Company's plant at Sault Ste. Marie. The American Bridge Company has the contract for the steel for additions to the Buffalo plant of J. H. Williams & Co., about 150 tons. The Ferguson Steel & Iron Company, this city, has orders for fabricating and erecting 200 tons for an addition to the plant of the Schoellkopf-Hartford-Hanna Company, Buffalo, for the manufacture of aniline dyes and for 130 tons for an addition to the plant of the Gould Storage Battery Company, Depew, N. Y., for both of which building operations the John W. Cowper Company holds the general contract. The Ferguson Company also has the contract for the steel for further addition to the Curtiss Aeroplane Company's plant, Buffalo, 100 tons, and for a like amount for bridge approaches for the New York Central Railroad, Rome, N. Y.

Old Material.—The week has shown a good deal of activity in heavy melting steel and cast scrap, with advances in price. Inquiries for old carwheels amount to several hundred tons. Considerable quantities of heavy melting steel have sold at \$11.50 gross ton, Buffalo, going largely to the principal local consumer. Sales of cast scrap are reported at \$11 and inquiries are out for considerable additional tonnage. The demand for borings is good, with the market 25c. per ton higher than last week. We quote dealers' asking prices, per gross ton, f.o.b. Buffalo, as follows:

Heavy melting steel.....	\$11.00 to \$11.50
Low phosphorus steel.....	13.00 to 13.50
No. 1 railroad wrought scrap.....	10.50 to 11.00
No. 1 railroad and machinery cast.....	10.50 to 11.00
Old steel axles.....	12.00 to 12.50
Old iron axles.....	16.00 to 16.50
Old carwheels.....	10.75 to 11.25
Railroad malleable.....	9.50 to 10.00
Machine shop turnings.....	5.75 to 6.25
Heavy axle turnings.....	8.50 to 9.00
Clean cast borings.....	6.75 to 7.00
Old iron rails.....	11.00 to 11.50
Locomotive grate bars.....	9.00 to 9.50
Stove plate (net ton).....	8.25 to 8.75
Wrought pipe.....	7.00 to 7.50
Bundled sheet scrap.....	7.25 to 7.75
No. 1 busheling scrap.....	8.50 to 9.00
No. 2 busheling scrap.....	6.50 to 7.00
Bundled tin scrap.....	9.00

Cleveland

CLEVELAND, OHIO, May 25, 1915.

Iron Ore.—The market is dragging along, with few sales and very little inquiry. Furnaces in general are not ready to buy unless they need some ore for a mixture, and so far a small tonnage has been booked outside of contracts with consumers that are affiliated with the mining interests. Shipments are light, but are expected to improve considerably next month, when the 5-cent reduction in freight rates from the Mesaba mines goes into effect. Some consumers are holding up shipments in order to secure the benefit of the lower freight rate. We quote base ore prices as follows, delivered to lower lake ports: Old range Bessemer, \$3.75; Mesaba Bessemer, \$3.50; Old range non-Bessemer, \$3.00; Mesaba non-Bessemer, \$2.85.

Pig Iron.—The week has been unusually dull in the local pig-iron market, there being no sales with the exception of a few small lots, and an almost entire absence of new inquiry. Most foundries appear to be at least partly covered for their requirements for the last half and no spot shipment sales are being made. The demand for Southern iron is as dull as that for Northern grades. Some consumers of Southern iron have not yet placed contracts for delivery for the last half, owing to the recent advance in price, which is apparently being maintained. Southern iron is quoted at \$9.75 to \$10, Birmingham, for No. 2 for the last half, and little if any can be had now at \$9.50 for prompt shipment. The foundry melt appears to have increased slightly this month as compared with April, and shipments on contract are about equal to production. While foundry iron is quoted at \$12.50 to \$12.75 Valley furnace and in Cleveland for outside shipment for No. 2, the lower price probably represents the market. We quote, delivered Cleveland, as follows:

Bessemer.....	\$14.55
Basic.....	\$13.45 to 13.60
Northern No. 2 foundry.....	13.25 to 13.50
Southern No. 2 foundry.....	13.50 to 14.00
Gray forge.....	13.00
Jackson Co. silvery 8 per cent. silicon.....	16.37 to 16.62
Standard low phos. at furnace.....	19.75 to 20.00

Coke.—There is still a fair demand for foundry coke contracts, which are being closed at \$2.25 to \$2.50 per net ton at oven, for delivery during the year from July 1. Standard brands of Connellsville foundry coke are quoted at the same price for prompt shipment. Furnace coke is inactive with \$1.50 the usual quotation for prompt shipment and \$1.65 to \$1.75 for the last half.

Finished Iron and Steel.—Specifications are coming out in good volume, but there is not much inquiry for contract material. The demand for steel bars is active, with the price firm at 1.20c., Pittsburgh, for delivery

until July 1. There is considerable competition among makers of hard steel bars for reinforcing purposes, and a price as low as 1.05c., Pittsburgh, is being named for hard steel bars. The demand for plates has improved materially owing to the fact that mills are now getting good orders for boiler plates, calls for which for some time had been dull. Tank plate orders continue good. One of the small mills has been selling plates recently as low as 1.07½c., Pittsburgh, but prices have stiffened up and local mills have advanced to 1.20c., Pittsburgh, for early delivery, and are booking orders at that price. Some new inquiry for shrapnel shells is being figured on in this territory, but as far as can be learned only one new order has been definitely placed, this being taken by a Youngstown manufacturer. The steel will be furnished by a Youngstown mill. An inquiry has come up here for 45,000 tons of steel bars for rifle barrels. A local agency has taken 600 tons of special shapes for tires for automobile trucks for war purposes. Black sheets are irregular, Ohio mills making low prices for shipment to some points. Quotations on No. 28 black range from 1.75c. to 1.85c., Pittsburgh, but it is stated that desirable orders will bring out a 1.70c. price. Galvanized sheets are quoted at 3.60c. for No. 28, and blue annealed at 1.30c. to 1.35c. for No. 10. The demand for structural material is light. The McClintic-Marshall Company has taken 400 tons for shop buildings for the American Shipbuilding Company, Cleveland. The new building of the B. F. Goodrich Company, Akron, for which bids will be received shortly, will require 1500 tons. There is a good demand for shafting, but price concessions on early shipments are reported, sales being made for prompt delivery at 71 per cent. discount; for the last half, 68 per cent. off is quoted. Local mills have advanced prices on iron bars to 1.15c., Pittsburgh. Warehouse business shows an improvement over April. We quote warehouse prices at 1.80c. for steel bars and 1.90c. for plates and structural material.

Bolts, Nuts and Rivets.—Not a great deal of new business in bolts and nuts is coming out, but there is a good volume of specifications. Prices are being well maintained. The demand for rivets is not active. Rivets are quoted at 1.45c., Pittsburgh, for structural and 1.55c. for boiler rivets for carloads, but these prices can probably be shaded \$1 per ton for desirable orders. Bolt and nut discounts are as follows: Common carriage bolts, ¾ x 6 in., smaller or shorter, rolled thread, 80 and 15 per cent.; cut thread, 80 and 10 per cent.; larger or longer, 75 and 17½ per cent.; machine bolts with h.p. nuts, ¾ x 4 in., smaller or shorter, rolled thread, 80 and 20 per cent.; cut thread, 80 and 15 per cent.; larger or longer, 80 and 2½ per cent.; coach and lag screws, 85 and 2½ per cent.

Old Material.—The market is dull. One Valley mill is buying considerable heavy melting steel scrap, but others are well filled up and out of the market. Cleveland mills are taking on some small lots of heavy melting steel at \$10.40 for future delivery. Other grades are inactive. The embargo against the plant of the Upson Nut Company has been lifted. Prices are unchanged. We quote f.o.b. Cleveland as follows:

Per Gross Ton	
Old steel rails, rerolling.....	\$11.00 to \$11.75
Old iron rails	12.00
Steel car axles	12.00 to 12.50
Heavy melting steel	10.25 to 10.75
Old carwheels	9.75 to 10.00
Relaying rails, 50 lb. and over.....	22.50
Agricultural malleable	8.00 to 8.50
Railroad malleable	10.00 to 10.25
Steel axle turnings	8.75 to 9.00
Light bundled sheet scrap.....	8.00 to 8.50
Per Net Ton	
Iron car axles	\$14.50 to \$15.00
Cast borings	6.50 to 6.75
Iron and steel turnings and drillings.....	5.75 to 6.00
No. 1 busheling	8.50 to 8.75
No. 1 railroad wrought	9.25 to 9.50
No. 1 cast	9.75 to 10.25
Stove plate	7.75 to 8.00

Bolt and nut makers May 26 advanced prices 5 per cent on small bolts and 2½ per cent. on large bolts, effective at once. Nut prices are unchanged. These prices will be quoted to jobbers for third-quarter contracts.

Cincinnati

CINCINNATI, OHIO, May 26, 1915.

(By Wire.)

Pig Iron.—Sales of foundry iron have been restricted to lots ranging from 30 to 300 tons. The inquiry is also light and buyers are generally acting in a very conservative way, more so than at any time for some weeks. An encouraging feature is that shipments on contracts are fairly satisfactory, with the exception of the stove foundries which are specifying somewhat slowly on iron bought some time ago. The agricultural implement manufacturers are also not melting so much iron as usual. A malleable inquiry of 500 tons is reported in this territory for last half shipment, and a similar quantity is expected to be bought by a Central Western manufacturer very soon. In spite of the lull in new business Southern makers are apparently making headway in establishing a higher price for foundry iron, especially for future shipment, but in the absence of firm offers covering fair sized tonnages it is difficult to ascertain what would be accepted on desirable business for nearby delivery. Northern foundry quotations are unchanged and \$12.50, Ironton, can be done for shipment through the year on either foundry, malleable or basic. The contracting for coke on the part of a few furnaces now idle indicates that they will probably blow in at an early date, though definite information on this point is lacking. Ohio silvery irons are dull, and previously quoted prices rule on the few transactions that are being made. Based on freight rates of \$2.90 from Birmingham and \$1.26 from Ironton we quote, f.o.b. Cincinnati, as follows:

Southern coke, No. 1 f'dry and 1 soft.....	\$12.90 to \$13.40
Southern coke, No. 2 f'dry and 2 soft.....	12.40 to 12.90
Southern coke, No. 3 foundry.....	11.90 to 12.40
Southern No. 4 foundry.....	11.40 to 11.90
Southern gray forge	10.90 to 11.40
Ohio silvery, 8 per cent. silicon.....	16.01 to 16.26
Southern Ohio coke, No. 1.....	14.76 to 15.26
Southern Ohio coke, No. 2.....	13.76 to 14.26
Southern Ohio coke, No. 3.....	13.51 to 13.76
Southern Ohio malleable Bessemer.....	13.76 to 14.01
Basic, Northern	13.76 to 14.01
Lake Superior charcoal	16.20 to 17.20
Standard Southern carwheel	26.90 to 27.40

(By Mail)

Coke.—Approximately 65,000 tons of 48-hr. coke was contracted for by two southern Ohio furnaces for shipment during the last half of the year. There have also been a number of contracts made for foundry coke, some of which cover requirements of the buyers for the next 12 months, although the foundries seem disposed to purchase smaller tonnages than customary. Prices are unchanged, Connellsville 48-hr. coke being still quoted at \$1.50 to \$1.60 per net ton at oven for prompt shipment, with a few oven operators holding out for \$1.70. Connellsville foundry coke is quoted from \$2.20 to \$2.40 for prompt shipment, with contract prices ranging from \$2.35 to \$2.50. Wise County contract prices are around \$2.40 to \$2.50 per net ton at oven.

Finished Material.—The sheet mills have advanced No. 28 galvanized sheets to 4c., Pittsburgh basis. This move was taken on account of the spelter situation. No quotations are issued except subject to change without notice and only for prompt acceptance. Local agencies report steel bars firm at 1.20c., Pittsburgh, for prompt shipment and 1.25c. for shipment after July 1. Not much business is being transacted, but there is some in sight for reinforcing concrete bars that are quoted at 1.70c. to 1.80c., f.o.b. Cincinnati. No. 28 black sheets are unchanged around 1.80c. to 1.85c., Pittsburgh. Railroad track material is slow. Hoops and bands are also quiet.

Old Material.—The scrap market is very dull. Few transactions of any note have been made lately, and an early change in the situation is not expected by the dealers. Most of the foundries have contracted for all of the scrap they need to run them through the next few months. The minimum figures given below represent what buyers are willing to pay for delivery in their yards, southern Ohio and Cincinnati, and the maximum quotations are dealers' prices, f.o.b. at yards.

Per Gross Ton		
Bundled sheet scrap	\$6.25 to	\$6.75
Old iron rails	10.50 to	11.50
Rolling rails, 50 lb. and up.	19.25 to	19.75
Re-rolling steel rails	9.75 to	10.25
Mining steel rails	8.50 to	9.00
Heavy melting steel scrap	8.50 to	9.00

Per Net Ton		
No. 1 railroad wrought	\$8.50 to	\$9.00
Cast borings	4.50 to	5.00
Steel turnings	4.50 to	5.00
Railroad cast scrap	9.00 to	9.50
No. 1 machinery cast scrap	10.25 to	10.75
Burnt scrap	6.50 to	7.00
Old iron axles	13.50 to	14.00
Locomotive tires (smooth inside)	8.50 to	9.00
Pipes and flues	5.75 to	6.25
Malleable and steel scrap	7.00 to	7.50
Railroad tank and sheet scrap	5.00 to	5.50

Birmingham

BIRMINGHAM, ALA., May 24, 1915.

Pig Iron.—The larger pig-iron consumers appear to have covered in April their wants for some time, when Birmingham district furnaces sold 400,000 tons. Outside of 15,000 to 20,000 tons purchased by pipe makers, this month has not been an active one and the volume of sales to date will not approximate one-fourth of those made up to the same time in April. Present buying is mainly by the small consumer, who failed to make his purchases during the big buying by the large interests and who, therefore, is standing the rise in prices. The number of small consumers in the market is considerable and the territory covered by this trade is quite extensive. The purchasing is largely for the last half. A lot of 1000 tons of so-called No. 2 was recently sold in Birmingham territory below \$9.75, but it developed on investigation that it was either high in sulphur or low in silicon, not being such iron as is now regularly classed at No. 2. Birmingham makers call attention to the fact that there are really four Southern irons, namely, Birmingham, Sheffield, Tennessee and Virginia. Sheffield iron reaches competitive markets at 25c. per ton freight under Birmingham. Tennessee iron reaches such markets at 50c. to 60c. or more under Birmingham. Virginia, of course, is recognized as a separate territory. Birmingham district quotations should, therefore, apply to Birmingham district iron alone. Confusion is sometimes caused by quoting Tennessee iron on a Birmingham basis. Sales of basic iron for Western delivery are reported. Home consumption of basic continues on a satisfactory scale. The tone of the iron market is firm. We quote, per gross ton, f.o.b. Birmingham district furnaces, for prompt delivery on the part of some makers, and the generally maintained basis, as follows:

No. 1 foundry and soft	\$10.25 to \$10.50
No. 2 foundry and soft	9.75 to 10.00
No. 3 foundry	9.25 to 9.50
No. 4 foundry	9.00 to 9.25
Gray forge	8.75 to 9.00
Basic	9.75 to 10.00
Charcoal	22.50 to 23.00

Cast-Iron Pipe.—Pipe makers are much interested in the recent decision lowering freight rates \$2 per ton to the Pacific coast and a good deal of future business for that section is figured on. Birmingham makers hope to regain the strong foothold once held there. The demand for gas and water pipe is still sufficient to justify extensive operations. Sanitary shops are slowing down. We quote, per net ton, f.o.b. pipe shop yards, as follows: 4-in., \$20; 6-in. and upward, \$18, with \$1 added for gas pipe.

Old Material.—The demand for scrap for use in steel works is active and transactions have been on a satisfactory scale. In other lines business is dull. We quote, per gross ton, f.o.b. dealers' yards, as follows:

Old iron axles	\$13.00 to \$13.50
Old steel axles	12.50 to 13.00
Old iron rails	12.50 to 13.00
No. 1 railroad wrought	8.50 to 9.00
No. 2 railroad wrought	7.50 to 8.00
No. 1 country wrought	8.00 to 8.50
No. 1 machinery cast	8.25 to 8.50
No. 1 steel scrap	8.00 to 8.25
Tram carwheels	8.25 to 8.50
Stove plate	7.00 to 7.50

Coal and Coke.—With the blowing in of two additional furnaces the output and consumption of coke have increased without, however, affecting the general

market, the furnace interests furnishing their own coke. Prices are well maintained for good bee-hive makes. We quote, per net ton, f.o.b. oven, as follows: Furnace coke, \$2.60 to \$2.80; foundry, \$3.15 to \$3.40.

St. Louis

ST. LOUIS, MO., May 24, 1915.

Pig Iron.—An improvement in the general feeling is reported this week by furnace representatives but it has not led to any marked increase in buying, at least as far as relates to contracts ahead, but there has been an increase in the requests that shipments on contract be hurried and even advanced. The aggregate of sales for the week may run as high as 2500 tons, but scarcely beyond that. A sale of 50 tons of ferromanganese was made at \$100 per ton and another of 100 tons is about to be closed.

Coke.—The contracting for coke for the year beginning July 1 has been fairly free and foundry and other consumers are taking about the same as last year. By-product coke is quotable at \$5.20 per net ton, St. Louis delivery.

Finished Iron and Steel.—There has been an improved tendency to contract for third and fourth quarters for rather small lots, though larger than for some time. Structural material is being taken by the fabricators for the most part on the hand-to-mouth basis. Bars are in fair request, the reinforcing material having the best of the call, while implement and vehicle makers are taking cautiously. No plates are selling. Standard section steel rails are dead and light rails are nearly so, the coal and lumber interests remaining out of the market. On all contracted material, however, shipments are going forward freely and in some cases are being hastened. Movement out of warehouse is active and the higher prices continue to be freely paid rather than commit to future contracts. We quote for stock out of warehouse as follows: Soft steel bars, 1.70c.; iron bars, 1.65c.; tank plate, 1.80c.; structural material, 1.80c.; No. 10 blue annealed sheets, 2c.; No. 28 black sheets, cold rolled, one pass, 2.55c.; No. 28 galvanized sheets, black sheet gauge, 3.85c. to 3.95c.

Old Material.—Aside from some little trading among the dealers, the scrap market is lifeless, as the mills and other consumers are maintaining their refusal to take scrap even on contract in many instances, while the rejections on technicalities continue. No lists have appeared since last report and those which were out have in many instances resulted in withdrawals because of the low prices bid. Relaying rails are in some demand. We quote dealers' prices f.o.b. St. Louis as follows:

Per Gross Ton	
Old iron rails	\$10.00 to \$10.50
Old steel rails, re-rolling	9.50 to 10.00
Old steel rails, less than 3 ft.	10.25 to 10.75
Relaying rails, standard section, subject to inspection	22.00 to 23.00
Old carwheels	8.75 to 9.25
No. 1 railroad heavy melting steel scrap	8.75 to 9.25
Shoveling steel	7.75 to 8.25
Frogs, switches and guards cut apart	8.75 to 9.25
Bundled sheet scrap	5.50 to 6.00

Per Net Ton	
Iron angle bars	\$10.00 to \$10.50
Steel angle bars	7.75 to 8.25
Iron car axles	13.50 to 14.00
Steel car axles	9.50 to 10.00
Wrought arch bars and transoms	10.75 to 11.25
No. 1 railroad wrought	7.50 to 8.00
No. 2 railroad wrought	7.50 to 8.00
Railroad springs	7.75 to 8.25
Steel couplers and knuckles	7.75 to 8.25
Locomotive tires 42 in. and over smooth inside	8.50 to 9.00
No. 1 dealers' forge	6.75 to 7.25
Mixed borings	4.50 to 5.00
No. 1 busheling	7.00 to 7.50
No. 1 boilers, cut to sheets and rings	5.75 to 6.25
No. 1 railroad cast scrap	7.75 to 8.25
Stove plate and light cast scrap	6.25 to 6.75
Railroad malleable	5.75 to 6.25
Agricultural malleable	5.25 to 5.75
Pipes and flues	5.50 to 6.00
Railroad sheet and tank scrap	5.75 to 6.25
Railroad grate bars	6.25 to 6.75
Machine shop turnings	4.75 to 5.25

The United States Cast Iron Pipe & Foundry Company will open a new office in Kansas City, Mo., at 1404 R. A. Long Building, about June 1. This office will be under the charge of R. C. Clifford, formerly of the St. Louis office of the company.

Boston

BOSTON, MASS., May 25, 1915.

Old Material.—Neither producers nor dealers see any very material change in the market. More scrap is being produced, which fact, as stated last week, has its influence. The New England producers, as a rule, do not speculate, and let their scrap go at current prices, in other words very close to quotations. This is true today. The smaller dealers, the collectors, are showing a tendency to hold off, in the belief that business conditions generally are improving and will affect the price of their holdings. However, there seems to be no reason for correcting the prices that have prevailed for some weeks. The quotations given below are based on prices offered by the large dealers to the producers and to the small dealers and collectors, per gross ton, carload lots, f.o.b. Boston and other New England points which take Boston rates from eastern Pennsylvania points. Mill prices are approximately 50c. per ton higher.

Heavy melting steel	\$8.25 to	\$8.50
Low phosphorus steel	13.75 to	14.75
Old steel axles	12.75 to	13.25
Old iron axles	20.25 to	20.75
Mixed shafting	12.00 to	12.25
No. 1 steel wrought and soft steel..	8.25 to	8.75
Skeleton (bundled)	5.50 to	5.75
Wrought-iron pipe	7.00 to	7.50
Cotton ties (bundled)	5.25 to	5.75
No. 2 light	3.25 to	3.75
Wrought turnings	5.00 to	5.50
Cast borings	5.00 to	5.25
Malleable	7.50 to	7.75
Stove plate	7.00 to	7.50
Grate bars	5.25 to	5.50
No. 1 machinery cast (price to consumer)	13.00 to	13.50
No. 2 machinery cast (price to consumer)	11.50 to	12.00

New York

NEW YORK, May 26, 1915.

Pig Iron.—A development of interest that has marked the past week is that a number of foundries are asking for shipments at a greater rate than called for in their contracts. At the same time, contrary to what has been the expectation of pig-iron sellers in view of the large purchases from Buffalo furnaces in March, some melters who bought in March are now asking for additional lots of iron. They have found their melt increasing beyond the contract rate of shipment and believe they will need more iron for last quarter. One inquiry of 1000 tons has come from Jersey City, another of equal amount from another New Jersey point and there are inquiries from the Hudson Valley for 1000 tons and 300 tons respectively. Recently a Canadian furnace company that sold about 25,000 tons in this country last year, canvassed the situation with reference to sending some iron to Atlantic coast points, particularly on the Delaware River, but prevailing prices were not attractive and it is not expected that Canadian iron will be a feature in this market for some time, if at all this year. There is an expectation that further inquiry for foundry iron will come from Italy, but the ocean freight situation is still very unfavorable to pig-iron exports. Another furnace, Crane No. 2, is about to resume operations in the Lehigh Valley; otherwise production goes on unchanged. Virginia iron at the prices recently quoted has not figured to any extent in the New England market and the same is true of Alabama and Tennessee iron in the Metropolitan district. We quote as follows, at tide-water: No. 1 foundry, \$14.50; No. 2 X, \$14 to \$14.25; No. 2 plain, \$13.75 to \$14; Southern iron, \$14.25 to \$14.50 for No. 1 and \$14 to \$14.25 for No. 2.

Ferroalloys.—Representatives of British producers of ferromanganese have been authorized to quote \$100, seaboard, for future delivery, subject to license to ship. This is an advance of \$12. It has not been caused by the demand from this side, but is regarded as an evidence that the manganese ore situation at the furnaces is not entirely satisfactory, and will be less so in case of a protracted war. It is expected that the price of the alloy will advance rather than recede in the not distant future. But the demand here is surprisingly light and no anxiety is apparent among consumers in

general. Advices are that more ferromanganese is being released for shipment, but none has arrived since the last report. Spiegeleisen is normal, the higher grades selling at \$27 at furnace. A western Pennsylvania company is selling a 20 per cent. spiegeleisen, rather high in phosphorus as compared with the domestic or British product, but in demand for some purposes. We continue to quote ferrosilicon, 50 per cent., at \$71 to \$73, Pittsburgh.

Structural Material.—An absence of large building projects and a fairly good proportion of small undertakings characterize the market. Nor are there any really large propositions in view, outside of the subway work, though the outlook for small ones is by no means unimportant. The tonnage of steel involved in the entire subway construction is about 600,000, of which nearly 450,000 tons has already been awarded. Bids on a new subway section are to be asked for this week. The lowest bidder for the extension to the Brooklyn elevated line, Section 2, Route 49, known as the Culver line, was the Oscar Daniels Company, and it is expected that the American Bridge Company will fabricate the 14,500 tons of steel needed. No decision has been made yet on the Albemarle building to be erected on the Hoffman House site at Twenty-fifth street and Broadway, 3000 tons, on the 1200-ton addition to the McAlpin Hotel, and on the grandstand for the Sheepshead Bay Motordrome, 3000 tons. The proposed building in Washington for the Department of the Interior, calling for about 6000 tons, is exciting some interest here. The total awards for extensions to the plant of the Scoville Mfg. Company, Waterbury, Conn., have now reached about 3500 tons, the last of which, about 1000 tons, went to the McClintic-Marshall Construction Company, the first units having gone to Levering & Garrigues. The Pennsylvania Railroad recently awarded about 1100 tons, of the 2600 tons of bridge work it was inquiring for, divided between the Fort Pitt Bridge Works, 700 tons, and the McClintic-Marshall Construction Company, 400 tons. It is now asking bids on material for nine more bridges, 1000 tons, leaving still about 2500 tons to be awarded. Other inquiries that have appeared were: 225 tons for two bridges for the Norfolk & Western; 2000 tons for a loft on Halsey street, Newark, which the Third Presbyterian Church of that city is to build; 500 tons for a high school at South Bethlehem, Pa.; 100 tons for several small bridges for the New York, New Haven & Hartford and 400 tons for the American Radiator Company's Pierce plant at Buffalo. Recent awards are as follows: 750 tons to the Hinkle Foundry Company for the Rockefeller Institute school on Sixty-fourth street; 700 tons for School No. 93 in the Borough of Queens to the Lackawanna Bridge Company; 250 tons for a garage on West End avenue to Adam Happle; 250 tons for the Vincent Astor market at Ninety-fifth street and Broadway to the Hinkle Foundry Company; 300 tons for a building for the Wentworth Institute at Boston, and 300 tons for a store house at Brockton, Mass., both to the American Bridge Company; 200 tons for the Hickok Mfg. Company of Harrisburg, Pa., to the Pennsylvania Steel Company; 350 tons for an extension to the Lambs Club to Milliken Bros.; 225 tons for a court house for Fairfield County, Conn., to the Bridgeport Boiler Works, and 375 tons for a cabinet building for the Victor Talking Machine Company at Camden, N. J., to an unknown contractor. We quote mill shipments at 1.20c., Pittsburgh, or 1.369c., New York, and from store, 1.85c. to 1.90c., New York. It is probable that desirable specifications are going at less than these prices.

Plates.—In addition to the large order of over 14,000 freight cars, awarded last week by the Pennsylvania Railroad, the same road has since placed orders for 189 all-steel passenger and baggage cars. They were allotted as follows: 24 passenger, 12 combination baggage and passenger, 5 baggage and 6 dining cars to the Pressed Steel Car Company; 20 passenger, 12 combination baggage and passenger and 7 baggage cars to the Standard Steel Car Company; 20 passenger cars to the American Car & Foundry Company; 15 baggage cars to the J. G. Brill Company, and 12 baggage and mail cars to the Pullman Company. At its Altoona

shops the railroad will build 42 baggage and mail and 14 passenger, baggage and mail cars. The 1000 automobile cars originally asked for will probably be substituted for some of those ordered from the Haskell & Barker Car Co. The minority stockholders of the Rock Island have asked for an injunction against the road's purchase of 5000 cars. A decision by the court is expected soon. In addition to the 1000 coal cars which the Western Maryland was reported last week as about to inquire for, 12 to 22 passenger cars are to be bought. The Norfolk & Western is expected to ask bids soon on 1000 freight cars; the 400 ore cars for the Lake Superior & Ishpeming are likely to be awarded soon. The rumor that the Lake Shore is to buy 8000 cars appears to be unfounded. The various reports regarding the placing by Russia of 7000 cars with the Pressed Steel Car Company and 7000 four-wheel cars with the Seattle Car & Foundry Company are authoritatively denied. The local domestic market is dull, but there is some inquiry for third quarter. The large tonnage of plates required for the recent car orders has added an element of strength to the market, and it is reported that Eastern mills have taken 10,000 to 20,000 tons of plates for some of the Pennsylvania cars. We quote steel plates at 1.15c. to 1.20c., Pittsburgh, or 1.319c. to 1.369c., New York, and from store, 1.85c. to 1.90c., New York.

Iron and Steel Bars.—Steel bars for foreign consumption continue to be a leading market factor. Recent developments in railroad car buying have been another element of strength. Specifications on contracts are excellent, but third quarter business is only moderate. Mills rolling bar iron report a fair tonnage placed in the week, but no great activity. We quote mill shipments of steel bars at 1.20c., Pittsburgh, or 1.369c., New York, and refined iron bars, 1.20c., to 1.25c., New York. Out of store in New York iron and steel bars are 1.80c. to 1.85c.

Cast-Iron Pipe.—Much interest is manifested in the result of the opening of bids yesterday on the great pipe contract in Philadelphia. While the award will be made to contractors who will lay the pipe, it is believed that the successful bidders have already made tentative arrangements for purchasing their requirements. Another point at which bids were opened yesterday was Woburn, Mass., which had asked for 500 tons of 6 to 16 in. All bids were rejected last week by Salem, Mass., and no time has yet been set for receiving new proposals. The Boston contract for 150 tons of special pipe for high pressure service was secured by the Davis & Farnum Mfg. Company at \$57 per net ton. No new municipal contracts of importance are in sight, but a great deal of private buying is in progress. The volume of this latter class of business is much greater than in April. Prices are holding well, and it is believed that this fact is a strong stimulus to the private buyer. Carload lots of water pipe, class B and heavier, are quoted at \$22 to \$22.50 per net ton, tidewater, while class A and gas pipe take an extra of \$1 per ton.

Old Material.—Nothing is being done at present in either heavy melting steel scrap or rolling-mill stock. Inquiries are completely lacking, and brokers are apparently disinclined to make purchases from dealers to fill contracts, waiting for the latter to loosen up on prices. Some indication appears that holders of considerable scrap are either losing faith in the market or find their load becoming heavy, but the great majority feel sanguine that a better demand must shortly be experienced and are firmly maintaining prices. Brokers' quotations to local dealers and producers, per gross ton, New York, are as follows:

Old girder and T rails for melting.....	\$8.75 to \$9.00
Heavy melting steel scrap.....	8.75 to 9.00
Relaying rails.....	19.00 to 19.50
Rerolling rails (nominal).....	9.00 to 9.25
Iron car axles (nominal).....	15.25 to 15.75
Steel car axles (nominal).....	11.75 to 12.25
No. 1 railroad wrought.....	10.50 to 10.75
Wrought-iron track scrap.....	9.50 to 9.75
No. 1 yard wrought, long.....	9.50 to 9.75
No. 1 yard wrought, short.....	9.00 to 9.25
Light iron.....	3.25 to 3.75
Cast borings.....	5.50 to 5.75
Wrought turnings.....	6.00 to 6.25
Wrought pipe.....	8.00 to 8.25

The movement of cast scrap does not increase to any

extent, as the foundries in this vicinity are either running at a restricted rate or have full stocks of scrap on hand. Quotations to consumers on cast scrap are as follows, per gross ton, New York:

Old carwheels.....	\$9.25 to \$9.50
No. 1 heavy cast, broken up.....	11.50 to 11.75
Stove plate.....	8.00 to 8.25
Locomotive grate bars.....	7.50 to 8.00
Malleable cast (railroad).....	8.00 to 8.35

British Market Unchanged

Pig-Iron Shipments to Neutrals Easier—Marked Bars Highest Since Boer War

(By Cable)

LONDON, ENGLAND, May 26, 1915.

The pig-iron market is better, owing to shipments to neutrals being facilitated. Meantime clearances remain very small and new business is restricted. Furnaces in blast are 165, against 167 a year ago. Stocks of pig iron in Connal's stores were 150,376 tons at the close of last week, against 147,071 tons one week previous.

Industrial conditions remain exceedingly difficult and a further reduction of output is possible. The demand for hematite iron is quiet. Finished steel is very firm and is affected by the strikes of colliers in the Midlands. The price of marked bars is now £11 (\$53.53), which is the highest since the Boer war. Prices of steel products are unchanged. We quote as follows:

Tin plates, coke 14 x 20, 112 sheets, 108 lb., f.o.b. Wales, 18s. 3d. (\$4.44) against 18s. (\$4.38) last week.

Cleveland pig-iron warrants, 65s. (\$15.82).

No. 3 Cleveland pig iron, makers' price, f.o.b. Middlesbrough, 66s. (\$16.06) against 65s. (\$15.82) one week ago.

Steel black sheets, No. 28, export, f.o.b. Liverpool, £11 5s. (\$54.75).

Steel ship plates, Scotch, delivered local yards, £9 15s. (\$47.44).

Steel rails, export, f.o.b. works port, £8 2s. 6d. (\$39.54).

Hematite pig iron, f.o.b. Tees, 102s. 6d. (\$24.94).

Sheet bars (Welsh), delivered at works in Swansea Valley, £7 (\$34.06).

Steel joists, 15 in., export, f.o.b. Hull or Grimsby, £9 10s. (\$46.23).

Steel bars, export, f.o.b. Clyde, £10 5s. (\$49.88).

Ferromanganese, f.o.b. £20 15s. (\$100.98).

Ferrosilicon, 50 per cent. c.i.f., £14 (\$68.13).

Lake Champlain Ores of 1914

The Witherbee, Sherman & Co. booklet of Lake Champlain iron ores, giving analyses of shipments for 1914, shows slight variations from the analyses of 1913. An added feature is the showing of screen tests for the various concentrated ores. In every case the fines representing the total through 80 mesh are high in silica and phosphorus. A new ore is listed, known as the New Bed Barton Hill. It runs 64.90 per cent. iron, 6.50 silica, 0.98 alumina, 0.62 lime, 0.32 magnesia, 0.025 phosphorus, 0.05 manganese and 0.58 titanium. It is offered for use in the manufacture of special Bessemer irons.

The Electrical Alloy Company, Morristown, N. J., announces that it can furnish in either wire or ribbon form, in coils, on spools or cut to straight lengths, pure nickel, monel metal, phosphor bronze, German silver, aluminum and nickel steel of various percentages.

The Ames Company, 302 Pearl street, Brooklyn, N. Y., has succeeded to and will continue the business of the Brooklyn Wire Forming Company, which was dissolved May 17. The company's specialty is the manufacture of all kinds of wire mantle supports.

Metal Market

NEW YORK, May 26, 1915.

The Week's Prices

Cents Per Pound for Early Delivery							
Copper, New York		Tin, New York		Lead, New York		Spelter, New York	
May	Lake	Electrolytic	New York	New York	St. Louis	New York	St. Louis
19.....	21.00	18.50	37.75	4.20	4.12½	15.75	15.50
20.....	21.00	18.50	37.50	4.20	4.12½	16.25	16.00
21.....	21.00	18.50	38.00	4.20	4.12½	17.00	16.75
22.....	21.00	18.50	.....	4.20	4.12½	17.25	17.00
24.....	21.00	18.50	37.75	4.20	4.12½	18.00	17.75
25.....	21.00	18.50	37.87½	4.30	4.22½	19.00	18.75

Copper is dull and concessions are to be had. Large arrivals of tin have softened the market. Lead has been advanced \$2 per ton. Spelter has been sold up to 20c. during excited buying. Antimony is quiet but strong.

New York

Copper.—The producers and large agencies persist in the statement that they are holding to 19c., full terms, for electrolytic, but the dullness which has prevailed for the past few days has brought out offerings of resale lots down to 18.50c., cash. It would take no great amount of demand to wipe out this quotation. Lake continues to be held at from 19c. to 23c., but the quotation for the very choice grades is nominal inasmuch as the producers are sold up for months to come. The exports of this month reached the excellent total, considering all things, of 28,425 tons. The market in every phase is a waiting one. It continues to be reported that Russia is inquiring for 10,000 tons, but there are no indications that orders have been placed.

Tin.—The feature of the week has been the heavy arrivals which have removed fears of any scarcity in the immediate future and brought the price down. Yesterday the quotation was 37.87½c. On Monday the Tokashima Maru arrived from London with 820 tons and the Lennox is now in port with 100 tons. Previous arrivals consisted of 780 tons, 615 tons and 405 tons, as well as a number of smaller ones, making the total for this month 3209 tons. The quantity afloat is 2970 tons, some of which is due to arrive before June 1. In general business has been dull, although last Thursday 300 tons, including both Banca and Strait, changed hands. Following this activity quiet set in again.

Lead.—The leading interest yesterday advanced its price \$2 per ton, or to 4.30c. per lb., New York, whereon independents made the St. Louis price 4.22½c. The advance is unexplained except for the belief that producers are comfortably sold ahead. So far as the independents go they do not appear to have been able to take care of large orders even on a basis of 4.15c., St. Louis. It is presumed that the leading seller could do so. The London price yesterday, £20 1s. 3d., which is equivalent to 4.35c. per lb., New York, did not afford a wide enough margin to permit of export business. Exports this month total 4431 tons.

Spelter.—A large business has been done in a market that has been excited and which has advanced by leaps and bounds. All kinds of reports have been current as to prices. Sales have been made at 18c. to 19c. for prime Western, while brass mill spelter has sold at over 20c. Nearby deliveries would easily bring 19.25c. to 19.50c., but there is practically none to be had. A feature of the market is the manner in which premiums are obtained for future delivery as well as for prompt metal. Sales at high prices have been made into December. One producer is credited with having sold 3,500,000 lb. of various grades May 19 at prices that range from 16.25c. to 20c., deliveries to be made from July to October. The spelter situation has entirely upset business in brass and Muntz metal products. For ordinary yellow sheets 25.50c. has been asked, and 24c. and 25c. has been paid for brass rods. The American Brass Company has withdrawn prices. If the present tendency continues it is predicted that substitutes will be found for sheets and other products into which spelter enters. Large orders for sheet brass cannot be placed, the brass mills not seeming to want them, especially if they are for export. One explanation of the great stringency is that makers of war munitions,

unable to get high grade spelter are using ordinary prime Western, having found that its use does not carry a prohibitive percentage of impurities into the finished product. The fact that the United States is endeavoring to supply more spelter than its producing capacity is adequate to supply is given as another vital reason. Predictions are for higher prices. Exports this month total 3431 tons.

Antimony.—The market has been quiet but firm. Chinese and Japanese are quoted at 35c. to 38c.

Old Metals.—The market continues dull. Dealers' selling prices are nominally as follows:

	Cents per lb.
Copper, heavy and crucible.....	17.00 to 17.50
Copper, heavy and wire.....	16.50 to 17.00
Copper, light and bottoms.....	14.00 to 14.50
Brass, heavy.....	12.00 to 12.50
Brass, light.....	8.50 to 9.00
Heavy machine composition.....	13.50 to 14.00
No. 1 yellow rod brass turnings.....	12.50 to 13.00
No. 1 red brass or composition turnings.....	11.00 to 11.25
Lead, heavy.....	3.75
Lead, tin.....	3.50
Zinc, scrap.....	13.00

Chicago

MAY 25.—Copper producers are adhering firmly to their prices, but the metal in second hands is subject to resale concessions. The prices of spelter and sheet zinc and the scarcity of the metal available for delivery are so abnormal as to be out of the field of speculation. We quote as follows: Casting copper, 18c.; Lake copper, 19c. for prompt shipment; small lots, ½c. to ¼c. higher; pig tin, carloads, 39c.; small lots, 41c.; lead, desilverized, 4.15c., and corroding, 4.40c., for 50-ton lots; in carloads, 2½c. per 100 lb. higher; spelter, nominally, 18.50c. to 20c.; sheet zinc, 21.50c., or price ruling date of shipment; Cookson's antimony, none obtainable; other grades, 36c. On old metals we quote buying prices for less than carload lots as follows: Copper wire, crucible shapes, 14.50c.; copper bottoms, 13.50c.; copper clips, 14c.; red brass, 11.75c.; yellow brass, 10.25c.; lead pipe, 3.375c.; zinc, 10.50c.; pewter, No. 1, 23c.; tinfoil, 30c.; block tin pipe, 34c.

St. Louis

MAY 24.—In the non-ferrous metal market the tendency upward continues and in some cases the advance is so sharp as to make trading practically impossible. Lead is quotable at 4.25c. to 4.30c.; spelter, 18.50c.; tin, 42c.; Lake copper, 19.50c.; electrolytic copper, 19.25c.; antimony, 40c. to 45c. In the Joplin ore market, while the choicest ores did not advance there was a sharp firming up of the lower grades, with the result that the basic quotation for 60 per cent. ranged from \$71 to \$75 per ton, with the top settlement at \$78. Some low grade ores sold as low as \$60, but the proportion was small. Calamine brought as high as \$40 to \$45 for 40 per cent., while the top settlement ran to \$51. Lead ore was quiet at \$51 for 80 per cent. Miscellaneous scrap metals are firmer, some being sharply higher, as follows: Light brass, 9c.; heavy yellow brass, 10.50c.; heavy red brass and light copper, 11.75c. to 12c.; heavy copper and copper wire, 15c. to 15.25c.; pewter, 23c.; tinfoil, 32c.; lead, 3.65c.; zinc, 12c.; tea lead, 3c.

The Detroit Foundrymen's Association held its annual meeting and banquet at the Hotel Tuller May 13. The attendance was large, 150 being present. Officers elected for the season of 1915-16 were as follows: President, A. F. S. Blackwood, Michigan Steel Casting Company; vice-president, Robert B. Carolin, R. B. Carolin Company; secretary, William A. Fletcher, American Blower Company; treasurer, Edward I. Chase, Cadillac Motor Car Company. The annual report of the secretary shows the association to be in a prosperous condition, now having upward of 200 members.

At the monthly meeting of the Good Fellowship Club of the Cleveland Crane & Engineering Company, Wickliffe, Ohio, May 27, Dr. L. B. Sherry, who has spent three months in France, will give an illustrated talk on experiences with wounded soldiers at the American Ambulance Hospital in Paris.

Iron and Industrial Stocks

NEW YORK, May 26, 1915.

The past week has again seen wide fluctuations in stocks, particularly of those companies which are known to have taken large orders for munitions of war. Some of these stocks that have quite suddenly been taken in hand and forced up are making records. Thus the common stock of the Crucible Steel Company of America touched 34, with enormous transactions, notwithstanding the fact that the preferred stock has piled up against it a large amount of accumulated dividends. The range of prices on active iron and industrial stocks from Wednesday of last week to Tuesday of this week was as follows:

Albis-Chal., com., 14 3/4 - 16 3/4	Pittsb'gh Stl., pref., 78
Albis-Chal., pref., 45 1/2 - 48 1/2	Pressed Stl., com., 42 - 48
Am. Can., com., 32 3/4 - 37 3/4	Pressed Stl., pref., 95 1/4
Am. Can., pref., 95 3/4 - 97	Ry. Steel Spring,
Am. Car & Fdy., com., 50 - 54	com., 28 - 32 1/4
Am. Car & Fdy., pref., 111 1/2	Republic, com., 26 1/4 - 29
Am. Loco., com., 43 - 50 3/4	Republic, pref., 84 - 89
Am. Steel Fdries., com., 15 3/4 - 16 3/4	Rumely Co., com., 4 3/4 - 5 1/4
Bald. Loco., com., 42 3/4 - 50 3/4	Rumely Co., pref., 13 1/4 - 13 3/4
Bald. Loco., pref., 110 1/4 - 111 1/4	Sloss, com., 29 1/4 - 34 1/4
Beth. Steel, com., 131 3/4 - 146	Pipe, com., 15 1/4 - 18 1/4
Beth. Steel, pref., 111 - 112	Pipe, pref., 44 - 45 3/4
Caso (J.L.), pref., 78 3/4	U. S. Steel, com., 51 3/4 - 56 1/4
Colorado Fuel, com., 25 3/4 - 32 1/4	U. S. Steel, pref., 105 - 106 1/4
General Electric, 150 - 154	Va. I. C. & Coke, 38
Gt. No. Ore Cert., 31 1/4 - 33 3/4	West'gh'se Elec., 87 1/2 - 99
Int. Harv. of N. J., com., 93 - 94 3/4	Chic. Pneu. Tool., 54 - 57 1/2
Int. Harv. Corp., com., 66 3/4 - 67	Cambria Steel, 47 - 49
Lackawanna Stl., 40 - 48	Lake Sup. Corp., 7 1/4 - 8
Nat. Enam. & Stm., com., 15 - 16 1/4	Pa. Steel, pref., 49 1/2 - 50
Nat. Enam. & Stm., pref., 80 1/4 - 82	Cruc. Steel, com., 22 1/2 - 34
	Cruc. Steel, pref., 86 - 93
	Harb.-Walk. Re-frac., com., 46
	Harb.-Walk. Re-frac., pref., 98
	La Belle Iron, com., 29

Dividends

The New York Air Brake Company, regular quarterly, 1 1/2 per cent., payable June 25.

The National Lead Company, regular quarterly, 1 per cent. on the common stock, payable June 30.

The Mergenthaler Linotype Company, regular quarterly, 2 1/2 per cent., payable June 30.

The directors of the Republic Iron & Steel Company, at a meeting which ordinarily considers dividend declarations, took no action as to a dividend on the preferred stock.

The Pettibone-Mulliken Company, regular quarterly, 1 3/4 per cent. on both the first and second preferred stocks, both payable July 1.

A Wire Rod Customs Decision

WASHINGTON, D. C., May 25, 1915.—In a comprehensive decision on an importation of coils of Swedish round iron rods, made by the Swedish Iron & Steel Corporation, the United States Customs Court of Appeals for the first time has construed paragraphs 103 and 113 of the Underwood-Simmons tariff, which contain important departures from the Payne-Aldrich law of 1909. The rods in question were from 60 to 100 ft. in length, the coils ranging in weight from 130 to 250 lb. The collector assessed duty at 10 per cent. ad valorem as iron wire rods under paragraph 113 of the act of 1913. The importers protested, claiming duty at the rate of 5 per cent. as round iron in coils under paragraph 103. The Board of General Appraisers overruled the protest. On review the Customs Court holds that the testimony, all of which was submitted by the importers, sufficiently sustains the conclusions of the board that the merchandise was iron wire rods. It appears that it was sold under that name and that in this country it is chiefly used as such material. Attention is called by the court to the fact that the terms of paragraph 113 as revised from the former tariff act are very comprehensive, including, as they do, rivet, screw, fence, nail "and all other iron or steel wire rods." The contention of the importers that the merchandise is not wire rods, because it must be cleaned by an acid bath before it can be drawn into wire, is declared by the court to be of no consequence since it appears that this is necessarily the case with all such importations because of the action of the atmosphere upon them while in transit. The court also disregards the testimony that very little iron

wire is made now and that the bulk of the so-called iron wire rods now imported is used in making chains, rivets, pins, etc. The decision of the board therefore is affirmed.

Amalgamated Asks Wage Advances

At the fortieth annual convention of the Amalgamated Association of Iron, Steel and Tin Workers, held in Louisville, Ky., last week, some changes, involving advances, have been proposed in the wage scales for puddling and finishing mills to be effective from July 1, 1915. Some of the foot notes have also been changed in the interest of the men.

The figures in the new puddling scale, which will be submitted to the manufacturers later, are the same when based on bar iron up to 1.25c., but commencing with 1.30c., an advance of 15c. per ton is asked for each advance of 0.05c. in bar iron. The price in the present scale at 1.30c. for bar iron is \$6.20, but the new price is \$6.35. Puddling is advanced 15c. per ton.

The scale for busheling on cinder bottom provides an advance of 5c. per ton, commencing with 1.30c. for bar iron, and 5c. additional for each increase over 1.30c.

In the muck mill scale a slight advance is asked on rates from 1.30c. for bar iron and higher. In all the other scales, such as knobbling, heating slabs and shingling, bar and 12-in. mills and skelp mills, an advance of about 5 per cent. is asked in the new scale over the present scale.

In the tin-mill scale a change was made in the preamble to read as follows: "It is agreed that when the actual average invoiced selling price of a box of 100 lb. coke tin plate is selling at \$3.50 f.o.b. mill, the tonnage rates shall be as follows: On each 5c. increase in the price per box, and on each 5c. decrease per box down to \$3.20 per box selling price, the following increases and reductions shall be in force."

In the black-sheet mill scale no changes were made.

In the tin-house scale the preamble was changed to read as follows:

"That tanners of Jumbo stacks shall receive 5.84c. per box and risers 3.69c. per box. All plates occupying over 48 in. of the rolls shall be classified as medium size plates, and tanners shall receive 6.15c. per box, and risers 3.87c. per box. For plates occupying 36 in. and less of the rolls, tanners shall receive 7.69c. per box and risers 5.15c. per box. On machines where rolls are 66 in. and less in length, all plates 22 in. and less in length shall be classified as small plates. It is also agreed that all plates 18 in. and less in width shall be counted as small plate.

It is probable that early in June a conference will be held between wage committees of the association and the bar-iron makers in the Central West that sign the Amalgamated scale, and also between similar committees representing the sheet and tin-plate mills. It is not expected there will be any trouble in arranging the sheet and tin-plate scales, as the rates in the new scale are practically those now in effect, but it is not unlikely that the bar-iron makers will oppose the increases asked in their rates.

No Germans or Austrians in the Iron and Steel Institute

At the annual meeting of the Iron and Steel Institute in London, May 13 and 14, the council presented a resolution which was adopted ordering the removal of the names of all Germans and Austrians from the list of members. The annual report showed the total membership at the beginning of the meeting to be 2086. Of 632 foreign members at the outbreak of the war 101 were of German, Austrian or Hungarian nationality. A number of resignations were presented at the fall meeting of the Institute, but 80 names out of the 101 remained, and to these the resolution applied.

The Chicago office of the C & C Electric & Mfg. Company, manufacturer of motors, generators and electric arc welding machines, has been moved. In the future it will be located at 911 First National Bank Building.

PERSONAL

E. A. Stillman, president Watson-Stillman Company, New York, returned May 23 from a business trip to France and England. In the former country he found all kinds of factories busy turning out munitions of war. All of the automobile plants are making shrapnel, most of them boring the cases from solid bars. A phonograph works is making shrapnel fuse timers. He visited a private plant for which \$3,000,000 worth of American equipment has been purchased, and which is designed to turn out 15,000 shells per day. England did not appear to be so busy as France in the making of war supplies. The ship on which he returned was held at Liverpool two days because of the inability to get a sufficient number of stokers.

At the annual meeting of the Machinery Club of the City of New York, May 25, the following were elected as members of the board of governors to serve four years: W. L. Saunders, A. B. See, W. A. Redding, D. W. Bigoney and W. P. Bowman. Charles Shults was elected to serve two years.

Emerson Findley, heretofore assistant advertising manager of *The Iron Age*, has been appointed Central Western manager, with headquarters at Cleveland, succeeding Percy A. Ware, who has resigned.

John D. Ryan, James J. Hill and James A. Farrell have been appointed a committee of the National Foreign Trade Council to appear before the Federal Trade Commission on the subject of co-operation in foreign trade. The commission will hold hearings at Boston, June 1 and 2, and at New York, June 3, 4 and 5.

Howard H. Cook, assistant secretary of the American Iron and Steel Institute, has returned to New York City from a stay in San Francisco, where he was a juror of awards in the Department of Education and Social Economy at the Panama-Pacific Exposition.

Bruce V. Crandall, secretary of the National Railway Appliances Association since July 1, 1911, has resigned, effective May 31. The increased demand on his time resulting from the growth of his own business has made this action imperative. C. W. Kelly, treasurer and director of exhibits, 349 Peoples Gas Building, Chicago, was elected secretary for Mr. Crandall's unexpired term, to be effective June 1.

Foster A. Haist, secretary and treasurer of the Keystone Mfg. Company, mechanics' tools, Buffalo, N. Y., succeeds J. E. MacArthur as factory superintendent.

A. H. Schaffert, for a number of years manager of the metal furniture department of the General Fireproofing Company, Youngstown, Ohio, has become general manager of the Eco-Thermal Company, Warren, Ohio, maker of gas stoves. This company was recently reorganized and its present officers are: President, W. W. Kelly, manager of the Cleveland Tool & Supply Company; vice-president, Charles Loneless, president of the Warren Lumber Company; secretary, W. H. Meub; treasurer, N. A. Wolcott.

V. D. Callaghan, who resigned as superintendent of the H. C. Frick Coke Company, at Lemont, Pa., has been succeeded by T. H. Doorley, superintendent of the works at Marguerite, and he has been succeeded by E. S. Wolfersberger, of Hecla, in turn succeeded by Robert Ramsey. G. W. English has been promoted from superintendent at Oliphant to Wynn, and J. A. Childs, superintendent at Juniata, has been named superintendent at Bitner also.

J. H. Lane, Uniontown, Pa., has been named general superintendent of the three coking plants of the Oliver & Snyder Steel Company, Pittsburgh, succeeding the late Fred C. Keighley. Mr. Lane formerly was superintendent of Oliver No. 3 plant.

The Transcontinental Freight Bureau has established a new rate on cast-iron pipe from Birmingham, Ala., to Pacific coast points. This rate, which was made effective May 22, is \$11 per net ton, a reduction of \$2.

Metal Branch of Hardware Association

The fourth annual meeting of the Metal Branch of the National Hardware Association was held in the Fort Pitt Hotel, Pittsburgh, May 21 and 22. The attendance comprised the leading manufacturers and jobbers in the sheet and tin-plate trades. A feature of the meeting was the number of interesting papers presented, notably on the spelter situation in relation to the increased cost of galvanized sheets, and also as to the best methods for securing an increased use of terne plates for roofing purposes.

The first session was called to order on Friday morning by W. H. Donlevy, chairman, and member of the Carter-Donlevy Company, Philadelphia. He congratulated those present on the large attendance and the prospects of valuable discussions of the important papers to be presented. A. J. Bihler, president National Hardware Association, made a short address, pointing out the benefits to be derived by sheet and tin-plate manufacturers and jobbers from being members of the association.

Fred M. Fuller, assistant manager of sales of the American Sheet & Tin Plate Company, presented an interesting paper on "What Can We Do to Increase the Sale of Terne Plates?" He advocated a campaign of education among roofers, builders and property owners, with the object of inducing them to adopt more largely terne plate for roofing purposes and pointing out to them its advantages. Frank K. Chew, editor of the Metal Worker, Plumber and Steam Fitter, read a paper, which was well received, on "Ways and Means by Which Manufacturers and Jobbers Can Increase the Sale of Their Products."

At the Friday afternoon session a number of reports were made by members from different sections of the country. It was the consensus of opinion that business everywhere is much better than in the latter part of 1914 and the early part of this year, and the outlook very favorable. At this session W. S. Horner, of W. S. Horner & Co., Pittsburgh selling agents of the American Rolling Mill Company, Middletown, Ohio, presented a paper on "Why Spelter Advanced." He gave interesting figures as to the output and consumption of this metal for the past three or four years.

On Friday afternoon a visit was made to the testing plant of the American Sheet & Tin Plate Company at Demmler, Pa., to inspect black sheets and terne plates that are being tested for atmospheric conditions. These sheets contain various percentages of copper, and the result of the tests so far has been very satisfactory, indicating that a copper content in black sheets or terne plates adds greatly to its lasting quality. In the evening a smoker and vaudeville entertainment was given in the Fort Pitt Hotel. George P. Early, special representative of the American Sheet & Tin Plate Company, was the leading speaker, his subject being "Fellowship."

On Saturday morning W. S. Abbott, Wheeling Corrugating Company, read a paper on "The Effect of the Spelter Market on Galvanized Sheets." He gave figures showing the increased cost of making galvanized sheets, due to the higher price of spelter. It is claimed that with spelter at 15c. per lb., the cost of making No. 28 galvanized sheets for most mills is close to 4c. per lb. At this session F. L. Greely, Herrick Company, Boston, Mass., read a paper on "Shipments of Less than Carload Lots Direct from the Mills." The last business was the awarding of prizes for an essay contest, started some time ago, on the subject of why terne plates should be used for roofing purposes.

New Snyder Electric Furnace Installation

The Halcomb Steel Company, Syracuse, N. Y., manufacturer of alloy and tool steels, has contracted for a 3-ton Snyder electric furnace which will run basic, melting and refining cold material. This furnace will have a 24-hour output of 24 tons of refined steel. It will take the cold scrap and melt and refine it on a basic bottom. The Halcomb Steel Company has used an electric furnace for steel manufacture for the past seven years, refining hot metal taken from an open-hearth furnace.

OBITUARY

PIERRE MARTIN, who, with his brother Emile, perfected the Martin open-hearth furnace at their works at Sireuil, France, in 1864, died May 23 at Paris. The Martin furnace was the first open-hearth furnace introduced in this country, which was in 1868, by the New Jersey Steel & Iron Company, Trenton, N. J., in which the late Abram S. Hewitt was largely interested. Mr. Hewitt visited the works at Sireuil and was so impressed with the work of the furnace that he took steps to arrange for its use in this country. As the Siemens regenerative gas system of heating was early applied to the Martin furnace, the steel made by this process has been known as Siemens-Martin steel in this country and Martin-Siemens steel abroad. The Bessemer gold medal of the Iron and Steel Institute was awarded to Pierre Martin at the meeting of the society in London on the 13th of this month. Mr. Martin was unable to be present and the medal was received in his behalf by a representative of the French Embassy.

WILLIAM H. MOHN, Reading, Pa., died May 20, aged 43 years. He was born in Reading and after working in a hat factory and next in the mounting department of a local brass and iron foundry for some years he became superintendent of the latter. In 1908 he formed a partnership with Edward Kershner, under the name of Mohn & Kershner, for the manufacture of art metal goods. Mr. Kershner died about a year ago, and since that time Mr. Mohn has been sole owner of the establishment. He leaves his widow and two children.

CARL EDWARD ANSELM, of Meyer & Anselm, iron and steel fabricators and contractors, Brooklyn, N. Y., died suddenly, May 11, at his home in that city, aged 51 years. He was born in New York City, but had long been a resident of Brooklyn. For 30 years he had been engaged in the structural iron trade. He leaves his widow.

M. E. DUNCAN, vice-president Canadian Car & Foundry Company, died in Montreal, May 23. The body will be brought to New York for burial. Mr. Duncan for many years was connected with the American Car & Foundry Company, before going with the Canadian Company in Montreal.

CHARLES F. ALBRECHT, superintendent of the Painter mills of the Carnegie Steel Company for about 15 years, died May 20 at his home in Pittsburgh, aged 56 years. He retired a few months ago on account of ill health. He leaves his widow and a son.

CHARLES O'HARA, a well-known iron and steel salesman, died May 23 at his home in Brooklyn, aged 77 years. He leaves six sons.

Organization of Engineering Foundation

The formal organization of the Engineering Foundation, the scope and aims of which were given in *The Iron Age* of February 4, 1915, was accomplished on Tuesday of this week at the Engineering Societies Building, New York. The Foundation is the first of its kind devoted to research work in engineering lines and to the promotion of the interests of the engineering profession. It starts with a gift of \$250,000 from Ambrose Swasey, Warner & Swasey Company, Cleveland, Ohio.

The board that was selected to administer the trust is as follows: Dr. A. R. Ledoux, past president American Institute of Mining Engineers; J. Waldo Smith, chief engineer of the New York City Board of Water Supply, Gas and Electricity; Dr. M. I. Pupin, professor of electromechanics in Columbia University; Dr. Alexander C. Humphreys, president Stevens Institute of Technology; Edward D. Adams, banker; Gano Dunn, president J. G. White Engineering Corporation; Howard Elliott, president New York, New Haven & Hartford Railroad; Dr. Charles Warren Hunt, secretary American Society of Civil Engineers; Charles E. Scribner, chief

engineer of the Western Electric Company; Jesse M. Smith, past president American Society of Mechanical Engineers, and Benjamin B. Thayer, president Anaconda Copper Mining Company. In order properly to consider the large number of applications from those who desire to use some of the fund for research work, a committee was appointed consisting of Dr. Ledoux, chairman, and J. Waldo Smith, Dr. M. I. Pupin, and Dr. A. C. Humphreys, all selected from the board. The board sent a telegram to Mr. Swasey expressing its appreciation of his gift and its pledge to carry out his aims.

Pittsburgh and Nearby Districts

Robert A. Carter, Sr., and Thomas B. Foley have been appointed receivers of the Carter Iron Company, a holding corporation for the Monongahela Iron & Steel Company, operating a bar-iron plant at Hays Station, Pittsburgh. The receivers have been ordered by the courts to operate the plant until further notice.

The limited partnership of Goff, Horner & Co., Ltd., Oliver Building, Pittsburgh, has been dissolved, owing to the death of Homer P. Goff, and has been succeeded by W. S. Horner & Co., a general partnership, which has assumed all liabilities and is to receive all moneys due. W. S. Horner & Co. are Pittsburgh sales agents for the American Rolling Mill Company, Middletown, Ohio. W. S. Horner is president and treasurer; George S. Phillips, vice-president, and Harry A. Lord, secretary.

The Carnegie Steel Company is now operating 40 of its 59 blast furnaces, an increase of 17 active stacks since last December. One Isabella stack at Pittsburgh was blown in May 19 on basic iron. Two Isabella stacks are still idle.

The American Steel & Wire Company is credited with having received an order from England for about 1000 tons of horseshoes, for delivery to the British army in France. They are to be made at its Shoenberger works, Pittsburgh.

The Columbia Sheet Steel Company, East Liverpool, Ohio, has been organized with a capital stock of \$600,000, and will build a sheet mill plant. Local capitalists are reported to have guaranteed first mortgage bonds of the new company to the amount of \$150,000. The names of officers have not been given out.

At a recent meeting of stockholders of the Ward Nail Company, Niles, Ohio, the capital stock was increased from \$50,000 to \$100,000, and officers elected as follows: David Tod, president; D. R. Ward, vice-president, and Thomas D. Irwin, secretary and treasurer.

The Youngstown Iron & Steel Company, Youngstown, Ohio, has just placed more contracts for equipment for its new steel plant. These include two standard gauge oil-burning locomotives, awarded to the H. K. Porter Company, Pittsburgh; a steel building, 55 x 450 ft., to be used as a sheet bar storage house, given to the Hunter Construction Company, Youngstown; soaking pit plates, to the Sterrett-Thomas Foundry Company, Pittsburgh; two large cold steel presses for the pressed steel department, to the Toledo Machine & Tool Company, Toledo, Ohio, and a large punching machine, to the Massillon Punch & Machine Company, Massillon, Ohio.

The National Forge & Tool Company, Erie, Pa., has recently been incorporated by Frederick J. McCoy, C. E. Wilder and John S. Gillispie.

John Helmuth & Co., 30 Church street, New York, have opened a Pittsburgh office, at 337 Oliver Building, in connection with the steel conversion business they are entering into, and whereby they will be able to cater to the special needs of consumers by converting from the raw and semi-finished material of their own selected analyses to finished steels. Through their Pittsburgh office, which is in charge of John Helmuth, more effective co-operation with the mills with which they have connections is also assured, resulting in better service to their customers. The New York office will continue in charge of J. W. Sanders.

Machinery Markets and News of the Works

DELIVERIES MORE REMOTE

Labor Shortage Now Serious Problem

Domestic Buying Shows Increase—Canadians Buying in Central West—Lull in Export Demand for Lathes

The pressure on machine-tool builders and their selling forces is sustained, not only by the demand for tools desired for turning out war materials, but by a steadily growing request for machinery needed in industrial lines. The importance of the latter is urging tool builders to the maximum effort to care for it, but regardless of all they can do, deliveries are still further off and naturally unsatisfactory to intending buyers. At the same time a great deal of courage is being shown by some plant managers in ordering for an October delivery. The manufacturing end of the machine-tool trade is not only harassed by the clamor for deliveries, but is confronted by a great problem in the growing scarcity of skilled labor. This is particularly true in New England, where the conditions are likened to those which existed in 1896 and 1897, when cities bid against each other for men. In New York miscellaneous buying is decidedly more active and more big war orders are before the trade. The market has been steady in Detroit and inquiries indicating new business are numerous. Both domestic and Canadian buyers are anxious to get shrapnel-making machinery in Cleveland and inquiries are coming out for late deliveries. Tire makers have purchased boring mills to a notable extent in Cincinnati, and the railroads have done some purchasing. In that city greater caution is being exercised in foreign sales. There is but little doing in St. Louis. In the Pacific Northwest an important consideration is the congestion of freight intended for the Orient. Shipbuilding is more promising at San Francisco, but the machine tool business is light.

New York

NEW YORK, May 26, 1915.

Local conditions are unchanged, except that deliveries are a trifle further off. The demand from manufacturers continues to grow, but business is restricted by the impossibility of making early shipments. Many companies are restrained from taking up war business by their inability to get tools. The leading makers of turret lathes have advanced their prices approximately 10 per cent.

A topic discussed in executive session at the meeting of the National Machine Tool Builders' Association at Atlantic City last week, an account of which appears elsewhere, was the need of greater conservatism in taking war orders. Payments must be positively assured. A member from Cincinnati who spoke on the subject aroused the keenest interest by the facts he presented.

The Bethlehem Steel Company has received another order from Great Britain which is reported to bring the total of war orders taken by that company to over \$100,000,000. The company is working its plant night and day in three eight-hour shifts, and is arranging with new interests to take sub-contracts. Among the companies which are expected to take them is a pneumatic tool company, the Baldwin Locomotive Works and the Carpenter Steel Company. The 50 turret lathes for export to Russia for which the Baldwin Locomotive Works inquired have not been purchased. The company is at present producing shells for

one of the foreign governments. It has an inquiry out for 300 machines for its own shops. The pneumatic tool company referred to has inquired for 200 machines for August delivery. A ball-bearing company has ordered 5 turret lathes to be delivered in October. The General Electric Company has purchased 50 high-speed drills made by Baker Brothers, Toledo, in addition to a lot previously taken. The machine has been adapted to the boring of shrapnel cases.

Several firms in Baltimore, Md., are figuring on making shrapnel, but are meeting with little success in finding the necessary tools. Bartlett, Hayward & Co., Baltimore, is contemplating shrapnel work and if they take it up will require 20 machines for finishing cases.

The Pennsylvania Railroad, Philadelphia, has asked for bids on four special machines used in the making of piston valve follower bearings. There are definite indications that at least one other Eastern railroad will soon be in the market for a group of machines. Manufacturers of patented locomotive specialties already are feeling the effect of the recent decision of the Pennsylvania Railroad to acquire more locomotives. The machine tool sellers, in turn, have received inquiries from the manufacturers.

The General Vehicle Company, Long Island City, is figuring on equipment for building aeroplane motors. The Acorn Mfg. Company, New York, is preparing to begin manufacturing in Lancaster, Pa., and is expected to buy additional turret lathes. The company manufactures door checks. The Hero Mfg. Company, Philadelphia, which makes several specialties has installed additional equipment. The Graphite Lubricating Company, Bound Brook, N. J., has installed some additional machinery to relieve the pressure upon its equipment. The company is working night and day, largely to fill the requirements of the automobile trade. Incidentally it may be said that the builders of motor cars and motor accessories in this territory are as busy as they are in the West. The Pullman Motor Car Company, York, Pa., is working night and day and has orders booked for months ahead. It makes a light automobile. Some further purchasing has been done by the Eisemann Magneto Company, Bush Terminal, Brooklyn. The Schaffer & Budenberg Mfg. Company, Brooklyn, manufacturer of gauges and precision instruments, has recently bought a few machines. The Crown Cork & Seal Company, Baltimore, recently purchased three large turret lathes for chucking work.

The plant of the Seneca Falls Mfg. Company, Seneca Falls, N. Y., manufacturer of lathes and wood-working machinery, has been appropriated by the State of New York on account of barge canal construction. The company has not had as yet enough time to formulate plans for re-establishing its factory.

The contract for the addition to the box factory of the Inman Mfg. Company, Amsterdam, N. Y., has been awarded to the H. C. Grieme Company of that city. It will be 40 x 75 ft. Bids have also been opened for an addition to its machine shop to be 70 x 80 ft. Both of these buildings will be two stories, of brick and cement construction. R. A. Wood is general manager.

The Folding Barrel Company, St. Paul Building, New York, has been incorporated with a capital stock of \$250,000, to manufacture a patented collapsible barrel. C. A. Lebett is president; A. K. Baldwin, vice-president; Thomas F. Kyle, treasurer, and W. B. Reed, secretary. The company has leased a factory in the borough of Bronx.

William H. Ludwig, 801 Eastern Parkway, Brooklyn, N. Y., has awarded the contract to Calendo & Cordi, 6005 Fourteenth avenue, Brooklyn, N. Y., for the construction of a two-story machine shop, 80 x 100 ft., to be erected by Frank A. Allano, 4518 Sixth avenue, Brooklyn, on Forty-fourth street, near Third avenue. The Buckingham Steel Company, 25 West Forty-second street, New York, has received the structural steel contract.

The Binghamton Sectional Safety Stop Company, Binghamton, N. Y., has been incorporated to manufacture a safety device for wood surfacing machines. It is having its device manufactured under contract. Thomas G. O'Brien is president; George L. O'Neill, vice-president, and W. F. Donley, manager.

The board of trade, Oxford, N. J., has donated a foundry and machine shop to the Oxford Foundry & Machine Company, of which George E. Hochgesang and Harmon B. Riehl are the organizers. The company will do a jobbing business and will run its first heat May 25.

The Gleason Works, Rochester, N. Y., manufacturer of gears and gear-cutting machinery, has increased its capital stock from \$325,000 to \$1,500,000. The company states that the increase does not mean that there will be an expansion or any radical change.

The General Electric Company, Schenectady, N. Y., has completed plans and will shortly commence construction of a one-story machine shop addition, 60 x 320 ft., to be made to its plant at an estimated cost of \$160,000. C. G. Hulth is superintendent of buildings.

The Syracuse Cold Storage Company, Syracuse, N. Y., of which J. Morrison Colwell is president, will build a reinforced concrete warehouse, 92 x 116 ft., seven stories and basement, to cost \$125,000.

A. Nowak & Son, millers, Buffalo, will build a five-story addition to their mill and grain elevator at Broadway and New York Central Railroad Belt Line.

The Cutler Desk Company, Buffalo, is erecting an addition to its factory at Churchill street and the New York Central Railroad.

J. H. Williams & Co., manufacturers of drop forgings, are making additions, 33 ft. x 136 ft. and 82 ft. x 142 ft., to their Buffalo plant at O'Neil street, Kenmore avenue and New York Central Railroad.

Clark Brothers, Olean, N. Y., have inquiries out for a list of 12 machine tools to provide requisite facilities for a shrapnel contract they have in hand.

The Automobile-Aviation Industries, Buffalo, has been incorporated by H. F. Sanford, E. P. and E. S. Leitze, 350 Franklin street, to manufacture motors, engines, machinery, etc., for air and water craft.

The Municipal Gas Company, Albany, will erect a powerhouse 125 x 200 ft., two stories and basement, of brick and concrete, at North Albany, to cost, with equipment, approximately \$500,000. The George A. Fuller Company, 111 Broadway, New York City, has received the contract for construction.

The DuBelle Grape Juice Company, Silver Creek, N. Y., will build a factory 50 x 200 ft., one story and basement, to cost about \$20,000.

Manchester, N. Y., is having plans prepared by C. C. Hopkins, engineer, Rochester, for a waterworks system, including a pump house. F. A. Tucker is village clerk.

The Firth Copper Company, Auburn, N. Y., has let a general contract for the erection of a factory 105 x 150 ft., one story.

The Mac Mfg. Company, Syracuse, N. Y., has filed articles of incorporation, with a capital stock of \$50,000, to manufacture automobile accessories, lamps, etc. F. F. MacLean, 1211 Madison street, E. E. Tilton and B. Wiles, Syracuse, are the incorporators.

The Bossert Company, manufacturer of electrical supplies, Utica, N. Y., is building a two-story and basement addition to its factory 35 x 99 ft.

The Curtis Plated Aluminum Company, Buffalo, N. Y., has been incorporated with a capitalization of \$50,000 to manufacture aluminum kitchen wares plated with nickel, brass or copper, aluminum reflectors, etc. Gerard O. Curtis, 801 Electric Building, Buffalo, is president, and D. Clinton, Buffalo, and A. C. Towne, Kenmore, N. Y., are directors.

St. Luke's Hospital, Utica, N. Y., has let contract for the erection of a boilerhouse 31 x 70 ft., one story.

The George A. Fuller Company, 111 Broadway, New York City, has received a contract for the erection of a two-story powerhouse at Albany for the New York Edison Company, Irving place and East Fifteenth street, New York City, to cost \$160,000. Thomas E. Murray is the engineer.

Philadelphia

PHILADELPHIA, Pa., May 24, 1915.

Contract has been awarded to Edward T. Bender, 6014 Torresdale avenue, Philadelphia, for the construction of a one-story brick and steel boiler house, 48 x 50 ft., to be erected for the Robert H. Toden Company, at a cost of about \$2000.

Downingtown, Pa., will receive bids until June 7 for a sewage system and disposal plant. Charles McFadden is secretary.

George Nuttall, Chester, Pa., manufacturer of heddle frames, etc., whose plant was damaged by fire recently, is making arrangements to re-establish his plant elsewhere in that city.

D. W. Dillman, Altoona, Pa., is preparing plans for a waterworks for Gallitzin, Pa., to cost about \$60,000.

The Chester Pattern Company, Chester, Pa., lost its stock, tools and machinery in a fire that destroyed the Birtwell

Building, May 8. It has leased a shop at Lamokin station, Chester, and hopes to have its full force of pattern makers at work in a few days. H. F. Kreig is president.

Montrose, Pa., will receive bids for a sewage disposal plant, etc., until June 10. The estimated cost is \$9000. V. H. Shaw, Lancaster, Pa., is consulting engineer.

Stearns & Castor, architects, Girard Building, Philadelphia, are receiving estimates for a slow-burning addition to the factory of the Autocar Company, Ardmore, Pa. It will be three stories, of brick and concrete construction.

The estate of Caleb J. Milne, Eleventh street and Washington avenue, Philadelphia, has awarded contract for the construction of a brick, steel and concrete garage, three stories, 58 x 75 ft., to the William Steel & Sons Company, 1600 Arch street, Philadelphia.

Louis Reisman, Dime Bank Building, Scranton, Pa., architect, has drawn plans for a four-story brick and terra cotta garage, 56 x 235 ft., to be erected at a cost of about \$75,000.

New England

BOSTON, MASS., May 25, 1915.

The great problem that is facing the machinery manufacturers is that of labor. In the committee meetings of the Atlantic City convention of the National Machine Tool Builders' Association last week this was a topic of serious consideration. War orders, with the pressure of demanded deliveries, have created a condition which promises to go far beyond that of 1906-1907, when cities bid for labor one against the other, and exchanged men, who profited accordingly in their wages, for the time being. The great shops in Bridgeport and Springfield, which will make army rifles, are disturbing elements throughout New England, for these two cities are adding something more than 10,000 men to what would be considered their normal demand for workmen, even were general business ordinarily good.

The project is under way of making great improvements on the Mystic River waterfront, Boston, involving, it is announced, the expenditure of about \$3,000,000. The Darrow-Mann Company, 40 Central street, Boston, wholesale coal dealer, is named as behind the plan, which will include a coal wharf and pocket to cost \$500,000, a steamship terminal for a line of steamers running to the Pacific coast, to cost \$2,000,000, and the probable construction of a sugar refinery.

The Wyman & Gordon Company, Worcester, Mass., manufacturer of drop forgings, has not yet completed the plans for the new heat-treating department, but the structure will be erected and equipped this summer. The plant is exceedingly busy, and increased capacity is highly desirable.

The Autogenous Welding Equipment Company, Springfield, Mass., manufacturer of oxy-acetylene welding apparatus and its products, has been succeeded by the Cave Welding & Mfg. Company, named for its president and the founder of the business, Henry Cave. George H. Smead is vice-president and Edward H. Mansfield treasurer. The capital stock is \$50,000.

The Sturtevant Mill Company, Boston, Mass., manufacturer of mining machinery, has let the contract for an addition, 50 x 180 ft., one story and basement, which will be used as a machine shop.

The Jacobs Mfg. Company, Hartford, Conn., manufacturer of chucks, will build a brick factory at Park street and Rowe avenue, 42 x 110 ft., three stories, of mill construction.

The addition to the plant of the Scovill Mfg. Company, Waterbury, Conn., brass manufacturer, to be erected on East Main street, will be larger than at first announced. The main building will be 309 x 600 ft., with two ells, one 218 x 309 ft., the other 166 x 200 ft., all one story.

The shipyard of the J. E. Mar & Son Company, West Haven, Conn., has been taken over by the New Haven Shipyard Company, organized in Bridgeport, Conn., to do ship building and repairing. The directors are Ellis E. Howard, J. Ernest Mar, of the J. E. Mar & Son Company, Eugene F. Perry and Foster L. Hawkins.

The MacArthur Concrete Pile & Foundation Company, 11 Pine street, New York City, has been awarded the contract for the foundation of an addition to the plant of the Malleable Iron Fittings Company, Branford, Conn. Philip Sellers, New Haven, Conn., is the architect.

The Turner Construction Company, 11 Broadway, New York, has been awarded the contract for the construction of a five-story manufacturing building for the Scovill Mfg. Company, Waterbury, Conn. This building is 70 x 300 ft. and is to be of reinforced concrete construction, with brick panel walls. Hugh L. Thompson, Waterbury, is the architect and engineer.

W. H. Nelson & Son, manufacturers of rivet specialties, have bought a factory with water power at Taunton, Mass., and are equipped to handle their increasing business more economically.

Baltimore

BALTIMORE, MD., May 24, 1915.

Several Baltimore firms are said to be bidding on large war contracts, and it is believed that they stand an excellent chance to receive their share of the work. The Poole Engineering & Machine Company, Woodberry, of which S. Proctor Brady is president, has a contract for shrapnel worth \$500,000. Mr. Brady has stated that the company is now bidding on several similar orders involving over \$1,000,000.

The Machinery Development Company, Baltimore, recently organized, has located at 151 North Gay street, Baltimore. It will manufacture a typesetting machine for tabular work, known as the logotype.

Baltimore & Ohio Railroad Company engineers are preparing tentative plans for a coal pier for Curtis Bay, Md., to cost about \$2,000,000. It will be of reinforced concrete and steel construction on concrete piles, about 700 ft. long and will be provided with an electric tram system and a large hoisting apparatus.

The former Skinner Shipbuilding & Dry Dock Company, Baltimore, has become operative as the Baltimore Dry Dock & Shipbuilding Company. It has considerable work on hand.

C. M. Anderson, architect, 324 North Charles street, Baltimore, is preparing plans for a fully-equipped garage to be constructed at North avenue and Lovegrove street, for E. W. Eisenhauer, 506 South Central avenue, Baltimore. It will be approximately 22 x 150 ft.

The Warren-Ehret Company, 131 Cheapside street, Baltimore, manufacturer of roofing and paving materials, has leased a two-story building, 40 x 186 ft., at 314 Guilford avenue.

With a capital stock of \$100,000, the Clark-Post Company, Baltimore, has been incorporated to manufacture chemicals. The incorporators are J. Spencer Clark, Frank A. Post and Joseph M. Warfield.

The Ideal Garage Company, Frederick, Md., has bought additional property and plans to enlarge its plant.

The DuPont de Nemours Powder Company's plant at City Point, Va., is said to be planning to double its output. More than 1200 men have been added to the force, making a total of over 9000.

The General Porcelain Company, Parkersburg, W. Va., is planning the construction of an addition, the principal building of which will be 300 x 500 ft.

With a capital stock of \$15,000, W. H. & C. F. Thompson, Baltimore, have incorporated as general contractors and engineers. The incorporators are William H. and Charles F. Thompson and J. Albert Berger.

Milton, Del., has devoted \$20,000 for the construction of a waterworks system. Two pumps and gasoline engines, and a 75,000-gal. tank are among the specifications. Charles E. Collins, Drexel Building, Philadelphia, is the consulting engineer.

Chicago

CHICAGO, ILL., May 24, 1915.

The buying of tools for shipment to Canada continues at a rate which makes this demand easily the most important consideration in the market. The supply of lathes, milling machines and high speed drills has become so nearly exhausted that the chief concern of local interest is the securing of machines rather than their sale. The demand for second-hand machinery, for resale in connection with this foreign business, has reached a degree of keenness seldom, if ever, witnessed in this market. Other buying is very light. No purchases have been made as yet for the Burlington or the Santa Fe railroads and no further formal inquiry has appeared from other railroad sources.

The Newport Boiler Company, Chicago, has been incorporated with a capital stock of \$30,000 by J. Herbert Newport, 203 South Dearborn street, Charles F. Newport and Jules B. Beuret.

The Kineto Machine Company, Chicago, has been organized with a capital of \$15,000 by Herman Kahn, Abe Steinberg, Henry Katz, and G. R. Wilson.

Preston & Wade have opened a shop at Canton, Ill., where they will do general foundry and machine work.

Fire caused damage to the amount of \$10,000 to the municipal electric light and water plants at Anderson, Ind.

The Packard Motor Car Company, Chicago, has plans completed for a five-story service station, 70 x 150 ft., to be erected at a cost of \$125,000.

The Sanitary District of Chicago, of which J. L. Barrett is architect, has prepared plans for a two-story substation, 31 x 91 ft., which with equipment to be installed will cost \$40,000.

Meyers Stein, 705 East Washington street, Springfield, Ill., is adding a machine shop to his plant at a cost approximating \$7500.

The Chicago & Northwestern Railway plans to erect a large elevator at the Kinnickinnic Basin in Milwaukee with a capacity of 1,000,000 bu., equipped with machinery to handle 2,500,000 bu.

The Rockford Tool Company has plans for the erection of a new factory building at Rockford, Ill.

The Interstate Mfg. Company, Oskaloosa, Iowa, denies the report that it is contemplating moving to Des Moines.

The Wrought Iron Heating Company, which has recently moved into its new plant at Des Moines, Iowa, is planning the erection of another building, with foundry equipment, to cost about \$20,000.

August Gottschlich, who has a foundry at Oskaloosa, Iowa, is erecting a new melting cupola shed and will enlarge the capacity of his melting equipment.

The water board of St. Paul, Minn., has decided to install new pumping equipment, including one 15,000,000-gal. high-duty and two 6,000,000-gal. low-service pumps, at a cost of \$95,000.

Russell, Minn., has voted \$7000 of electric light plant bonds.

Detroit

DETROIT, MICH., May 24, 1915.

The local machinery market has been steady the past week, with a very fair volume of orders for single and small groups of tools. A goodly proportion of this business is from local sources and indicates a favorable outlook in the metal manufacturing line. Second-hand tools continue in good request. Inquiries are numerous and cover a wide range of equipment. In special equipment lines an improved demand for cranes is noted. Building conditions show improvement and some industrial projects, which have been under consideration for several months, are now being reported out by the architects.

The Monarch Motor Car Company, Detroit, automobile manufacturer, has been reorganized under Delaware laws with a capital stock of \$400,000. Additional factory space and equipment are being negotiated for, and the output of the company will be greatly increased. R. C. Hupp, Detroit, remains at the head of the reorganized company.

The Park Chemical Company, Detroit, has acquired a new factory site and will proceed at once with the erection of a new plant. Two buildings will be erected, one 50 x 100 ft., and one 25 x 50 ft., each one story. The company, which manufactures case hardening materials, tempering oils, etc., will add a number of products to its line. W. P. Woodside is president.

The Paige-Detroit Motor Company, Detroit, automobile manufacturer, will erect an addition to its main manufacturing building 50 x 500 ft., three stories. The addition will necessarily involve the purchase of considerable new equipment.

The J. C. Wilson Company, Detroit, which has heretofore manufactured automobile bodies, has announced that it will add the manufacture of automobile trucks to its present line. It has a plant at Fifteenth and Warren avenues.

The Packard Motor Car Company, Detroit, has awarded the contract for the erection of a one-story brick addition to its plant.

The Wenzel-Hall Company, Detroit, has been incorporated with \$25,000 capital stock to manufacture automobiles and machinery. Thomas J. Wenzel, Charles M. Hall and Don M. Coffman are the incorporators.

The Metropolitan Motor Company, Detroit, and the Michigan Taxicab & Garage Company, Detroit, each plan the establishment of a garage and repair shop.

The Signal Motor Truck Company, Detroit, manufacturer of automobile trucks, has increased its capital stock from \$60,000 to \$85,000.

The American Forging & Socket Company, Pontiac, Mich., has been organized with a capital stock of \$100,000 and has purchased the plant of the Harwood Electric Company, Pontiac. It will manufacture bows, sockets and other automobile accessories. H. W. Wiley, E. W. Rathbun and E. P. Heaton are stockholders.

Baker & Co., Allegan, Mich., furniture manufacturers, have begun the erection of an addition to their plant. The new building will be 70 x 90 ft., two stories.

The American Malleable Company, Owosso, Mich., has awarded the contract for the erection of a one-story addition, 36 x 75 ft., to be used principally by the molding department.

John F. King, vice-president of the King Paper Company, Kalamazoo, Mich., will shortly sever his connection with that company and contemplates the formation of a company to establish a paper mill and coating plant at Kalamazoo. Mr. King has long been prominently identified with the paper trade.

C. H. Hancock and associates, Chassell, Mich., will establish a large stavemill near that point.

The Novo Engine Company, Lansing, Mich., has placed contracts for an extension to its plant. The new building will be 60 x 200 ft., partly one story and partly two stories, to be used for machine shop purposes.

The Riverview Coated Paper Company, Kalamazoo, Mich., will shortly begin the erection of two additions to its plant, one for storage purposes and the other a machine shop.

The Traverse City Iron Works has been awarded the contract for installing a waterworks system at Orion, Mich., to cost \$30,000.

The Jackson Cushion Spring Company, Jackson, Mich., manufacturer of springs and spring structures, is building an addition of concrete and steel and is adding machinery that will more than double its capacity. W. R. Smith is secretary and general manager.

Indianapolis

INDIANAPOLIS, IND., May 24, 1915.

The South Bend Brass Foundry & Machine Company, South Bend, Ind., has been incorporated with \$15,000 capital stock by G. H. Thayer, F. N. Troupe, and P. M. Thayer.

The Home Lighting Company, Connersville, Ind., has been incorporated with \$10,000 capital stock, to manufacture lighting plants. The incorporators are F. J. Snyder, L. Snyder, and George Cain.

The Motsinger Device Company, Lafayette, Ind., has increased its capital stock from \$150,000 to \$200,000.

The Foldable Swing Company, Clinton, Ind., has been incorporated with \$15,000 capital stock to manufacture swings and other articles. The directors are S. A. Johnson, G. H. Briggs, and T. E. Briggs.

The Maxwell-Newcastle Mfg. Company, Newcastle, Ind., will increase its motor power by the addition of a turbine engine to be supplied by the Allis-Chalmers Company, Milwaukee, Wis.

The storage barn of the Ft. Wayne & Northern Indiana Traction Company, Lafayette, Ind., was destroyed by fire May 20, the loss including an electric brake test car and other equipment, valued at over \$10,000.

The Lavelle Foundry Company, Anderson, Ind., has bought the foundry of the Anderson Scale & Paint Company, Hamilton, Ohio.

The Pathfinder Company, Indianapolis, Ind., has been incorporated with \$250,000 capital stock, to manufacture automobiles. The directors are C. W. Richards, G. I. Lukin and Leo Kaminsky.

Frank A. Horner, Brazil, Ind., has been appointed receiver for the Knight-Brinkerhoff Piano Company, of that city. The plant will be continued in operation.

A factory will be established at Evansville, Ind., for the manufacture of a tractor cultivator by James Bradley, R. A. Graham and C. S. Winston.

The White-Smith Mfg. Company, formerly of Hastings, Mich., has moved its plant to Newcastle, Ind., and reorganized with a capital of \$50,000 to continue the business of the American Vacuum Cleaning Company.

The American Molding Machine Company, Terre Haute, Ind., has been organized with a capital stock of \$20,000 by Lewis J. Cox, William C. Norcross and Walter C. Ely.

The La Porte County commissioners, La Porte, Ind., will receive bids until June 19 for mechanical stokers for the county court house.

The Willey-Wray Electric Company, 127 Opera place, Cincinnati, has been organized to do a general electric supply and repair business. It expects also to manufacture a number of small electrical specialties.

The National Oiler Company, Richmond, Ind., has changed its name to the National Factories, Inc.

Milwaukee

MILWAUKEE, WIS., May 24, 1915.

Proof that general conditions are showing improvement and that manufacturers are facing a prosperous season is shown in the experience of the Vilter Mfg. Company, builder of engines and ice and refrigerating machinery, which has been meeting with such an increase in business that it is operating its plant 23 hours a day. Not only is its home trade expanding, but its business in foreign countries is picking up. Contracts have been received for plants in Vladivostok, Siberia, that will fill five freight cars in transporting, five carloads of refrigerating apparatus for China and eight carloads for Japan. None of these contracts is for war materials, but to fill requirements in commercial enterprises, such as packing houses, cold storage houses and ice plants.

Milwaukee manufacturers and shippers appeared before the Wisconsin Railroad Commission at a hearing held in this city last week to consider the protests made against the proposed advance in switching charges between Milwaukee industries on the Chicago, Milwaukee & St. Paul Railroad. The increase is from \$6 to \$9 per car, an advance of 50 per cent.

The Allis-Chalmers Mfg. Company, West Allis, Wis., is adding a foundry, one and two stories, 85 x 112 ft., and a factory building 165 x 196 ft., five stories.

Contract for the new powerhouse and water plant at Holland, Mich., has been awarded to Jonkeman & Clark, Milwaukee, Wis.

The Simple Engine Company, of Minnesota, has decided to locate its plant at Ashland, Wis.

The Equitable Electric Light Company, Lake Geneva, Wis., has increased its capital stock from \$9000 to \$150,000.

The Wisconsin Securities Company, Milwaukee, has purchased the Sheboygan Gas Light Company, Sheboygan, Wis. Steps will be taken at once to improve the property. Clement C. Smith is president.

Fred W. Ackermann, one of the founders of the West Bend Plating Works, West Bend, Wis., has sold his interest to his partner, A. Herman.

The Felker Brothers Mfg. Company, Marshfield, Wis., has completed plans for the erection of a factory addition, which will be devoted to the manufacture of a new line of barn equipment.

The East River Iron & Brass Works, Green Bay, Wis., has leased its foundry to Theodore and A. Helgersen, who will operate the plant under the name of the Helgersen Brothers Iron Works.

Cleveland

CLEVELAND, OHIO, May 24, 1915.

The demand for machinery for making shrapnel continues heavy. Lathes and screw machines for shipment to Canada are in great demand and considerable inquiry from the East is for use in that section or for export. An interesting feature of the market is the appearance of inquiries for machines for delivery late in the year for making ammunition, indicating the placing of additional orders for war material for extended future delivery. While round lots of lathes for early delivery are hard to find, dealers are making efforts to care for their regular customers by securing regular consignments of stock orders. A local sales agency has received an inquiry for boring rifle barrels, but could not promise deliveries before January. Machine-tool plants that build machinery for making war material are being crowded to their utmost capacity and the present supply of skilled labor is inadequate, the scarcity being particularly noticeable in turret lathe and engine lathe hands.

The Morgan Engineering Company, Alliance, Ohio, has received quotations on an inquiry for 16 heavy-duty engine lathes—four 42 x 31-in., four 48 x 38-in., four 36 x 30-in., and four 24 x 18-in.

The National Pipe Die Machine Company, Archbold, Ohio, recently incorporated with a capital stock of \$10,000, will erect a plant for the manufacture of pipe threading dies.

The Ohio Light & Power Company, Tiffin, Ohio, has decided to erect a new plant, but work on it may not be started for some time.

The Western Automatic Machine & Screw Company, Elyria, Ohio, will build a three-story addition to its plant.

The Hasse Mfg. Company, Toledo, Ohio, has been incorporated with a capital stock of \$10,000 by Paul L. Goodes, William L. Shasberger, I. F. Anderson, and others, to manufacture horseshoes.

The Sommers Motor Company, Bucyrus, Ohio, will enlarge its plant, expending \$10,000 or more in an extension and new equipment.

The plant of the Canton Drop Forging & Mfg. Company, Canton, Ohio, was damaged considerably by fire a few days ago.

The Globe Motor Car Company, Canton, Ohio, will shortly begin the erection of a four-story fireproof brick, steel and concrete garage.

Belleville, Ohio, has voted \$25,000 of bonds which will be sold June 10, the proceeds to be devoted to the construction of a waterworks system.

Cincinnati

CINCINNATI, OHIO, May 24, 1915.

Makers of boring mills report a very good demand from rubber tire manufacturers, and lately quite a number of orders have been received from northern Ohio firms. The railroads are also placing some scattered orders for different kinds of machine tools, including planers. While a lull in the call for lathes from abroad is evident, considerable business is still in sight from that source; but as a rule lathe builders are exercising more caution in accepting foreign orders, and are bending their energies toward supplying domestic customers.

Local builders of electric drilling and grinding machines are very much interested in an inquiry from a domestic firm for 200 bench grinders that are to be exported. On account of the quick delivery wanted it is quite probable that the order will be divided between several different manufacturers. The domestic call for electric drilling machines continues to improve.

Additional Ohio manufacturers have taken contracts for the manufacture of war munitions, and it is currently reported that a firm in Columbus is on the verge of closing a large contract that will be sublet by a Dayton concern.

Second-hand machinery dealers report a slow but steady improvement. No change is reported in the foundry situation, and only those making a specialty of machine tool castings are operating on full time.

The Stacey Brothers Gas Construction Company, Elmwood place, Cincinnati, will be incorporated with \$120,000 capital stock and will erect a plant for the manufacture of gas oven outfits. The principal building will be 100 x 400 ft., one story, of brick and steel construction. Gas engines, direct-connected to electric generators, will be installed, and in addition the company will need metal forming machinery and a number of machine tools, the list of which has not yet been made up. J. E. and A. J. Stacey are the principal incorporators.

The Instantaneous Glue Converter Company, 221 West Third street, Cincinnati, has acquired a site in North Cincinnati on which it will erect a plant. Only special equipment will be required.

The Ohio Veneer Company, Colerain and Brashears avenues, Cincinnati, has let contract for an addition, for storage purposes, to its plant. Later on it expects to increase its manufacturing facilities.

It is reported, but not yet confirmed, that the J. H. Day Company, Cincinnati, manufacturer of bakers' machinery, paint mixers and other specialties, has acquired a site in Bond Hill, a suburb, on which a manufacturing plant will be built. The company's present plant is in the Camp Washington district. In case its plans are carried out a foundry will be operated in connection with the manufacturing plant.

The Bader-Giebel Machine Company, 3089 Colerain avenue, Cincinnati, Ohio, is adding to its equipment. Among the machine tools wanted is a 24-in. x 8-ft. planer.

The D. Gruen Sons' Company, Cincinnati, watch maker, has increased its capital stock from \$200,000 to \$500,000 and has plans under way for enlarging its plant.

C. W. Handman, business manager of the board of education, Cincinnati, is advertising for bids to be opened June 14 for heating, ventilating and vacuum cleaning equipment for the new Warsaw Public School building.

Plans are rapidly developing for the proposed immense plant of the Atlas Portland Cement Company, New York City, which is to be erected at Tippecanoe City, Ohio, a Dayton suburb.

Frank H. Smith, architect, Dayton, Ohio, is preparing plans for an envelope and printing plant to be constructed for the Mercantile Corporation, Dayton. The building and equipment is estimated to cost \$750,000.

The Springfield Planing Mill Company, Springfield, Ohio, is making an addition to its plant, 78 x 200 ft., one story, of wood construction. Very little new equipment will be required.

The Johnson Mfg. Company, Urbana, Ohio, has awarded contract to J. A. Poss, Springfield, Ohio, for an addition to

its plant, estimated to cost \$15,000. Nothing is known as to machinery requirements.

The Victor Rubber Company, Springfield, Ohio, has let a contract for an addition to its plant, 30 x 100 ft., two stories, of brick construction.

The Solar Metal Products Company, which recently removed its offices from Chicago to Columbus, Ohio, has purchased quite a lot of equipment for its new plant that will be in operation July 1. The main building is 100 x 235 ft., one story, of brick and steel construction.

The Portsmouth Supply & Mfg. Company, Portsmouth, Ohio, is having plans prepared for a three-story addition that will be used principally for storage purposes.

The Central South

LOUISVILLE, KY., May 24, 1915.

Most of the machinery business now being handled consists of small jobs. Boiler manufacturers are getting a good deal of this kind of work, but comparatively few big orders are coming out. Electrical equipment is quiet, though several large orders have been placed recently locally, and motor manufacturers are optimistic regarding the situation. Machine tools continue to sell well, the export demand remaining brisk. One local house reported having booked orders from France, Holland and Germany in the same day. The sales were all for war purposes. Special machinery is generally quiet, though wood-working equipment continues in fair demand, considering the state of trade with the planing-mills and furniture factories in this territory.

The J. F. Kurfes Paint Company, Brook and Market streets, Louisville, is completing its factory and is about ready to let contracts for motors and paint-grinding equipment.

A. McCarley, Auburn, Ky., will purchase a gasoline engine for a small flourmill.

L. S. Powers, Hawesville, Ky., plans to establish a sewer pipe plant. Frank Robinson will move his tile plant from Maceo, Ky., to the Hawesville property.

The Twentieth Century Metallic Packing Company, Lexington, Ky., has been organized to manufacture a piston ring for automobiles. A plant will be established in Detroit by E. J. Welch, president of the company.

The International Ditching & Road Machinery Company, Owensboro, Ky., has been organized with \$50,000 capital stock by W. R. Williams, C. A. Rogers and J. C. Bunch. Manufacturing plans have not been decided on.

The River Sand & Gravel Company, Owensboro, Ky., will purchase steam derricks for handling sand. P. A. Yager and J. G. Delker are in charge.

The Southern Foundry Company, Owensboro, Ky., has elected J. J. Trefz, superintendent of the Anglo-American Mill Company, Owensboro, to the position of manager. The company will discontinue manufacturing structural iron, but will do general foundry jobbing work.

The Anglo-American Mill Company, Owensboro, Ky., recently reported in the market for equipment for a foundry of 40 tons a day capacity, will not build it this year on account of unsettled conditions. J. J. Trefz is general superintendent.

Madison Bosworth, S. L. VanMeter, and others, Lexington, Ky., will equip an automobile repair shop.

The Model Laundry, Maysville, Ky., is in the market for steam power equipment for its new plant.

S. V. Schaeffer, Henderson, Ky., has begun the erection of an excelsior factory. The machinery has not yet been bought.

The plant of the Glasgow Marble Works, Glasgow, Ky., was burned recently with a loss of \$4000.

The machine shop of W. C. Moss, Glasgow, Ky., was damaged by fire.

The Kingsport Brick Corporation, Kingsport, Tenn., has decided on the details of its new tile plant. The main plant will be three stories, 84 x 252 ft.; the engine and boiler room will be one story, 30 x 60 ft.; the machine shop will be two stories, 75 ft. square. About 10 dry kilns will be built. The contract for the special equipment has been let to the American Clay Machinery Company, Bucyrus, Ohio, but the power machinery has not yet been bought.

Equipment for the new municipal electric light plant at Milan, Tenn., includes a 100-kw. generator and a 25-kw. generator with direct-connected engine. The local waterworks is also to be improved. J. D. Denny is in charge of the purchases, which will aggregate \$8000.

W. C. Morris, Union City, Tenn., is asking for prices on a 10-hp. engine and generator.

Heath & Co., Charlotte, N. C., will establish a hydro-electric plant on Nolichucky River, near Erwin, Tenn., it is reported.

The Boone Fork Lumber Company, Elizabethtown, Tenn., has been organized with \$50,000 capital stock, with W. S. Whiting, Asheville, N. C., president. It has purchased timberlands and will erect sawmills with a capacity of 40,000 ft. a day. The cost of the power equipment and special machinery will be \$25,000.

F. H. Heiskell, Memphis, Tenn., is building a machine shop at 648 Marshall avenue. The contract for the building, which will cost \$10,000, has just been awarded.

A car repair plant will be built at Nonconnah, Tenn., by the Illinois Central Railroad at a cost of \$200,000. The plant will be erected of concrete and steel, and will replace temporary sheds where the repair work has been carried on.

A. H. Bastin & Son, Lancaster, Ky., plan the erection of a planing-mill.

H. M. Daniel, Gulfport, Miss., plans to establish a factory in Owensboro, Ky., to make furniture. It will cost \$20,000.

W. P. Watson and M. Simpson, Georgetown, Ky., are purchasing equipment for an automobile garage and repair shop.

The Central Motors Company, Owensboro, Ky., will build a garage to replace one recently burned, and will probably need machine tools for the repair shop.

Samuel C. Coffin, High Point, N. C., has let contract for the erection of a frame furniture factory, 60 x 144 ft., to replace his plant recently destroyed by fire. The cost will be about \$5000.

Waynesville, N. C., has voted \$25,000 of bonds for electric light and power system.

The Atlantic Coast Lumber Corporation, Georgetown, S. C., will erect a small machine shop at Andrews, N. C. R. J. Clifford is president.

St. Louis

ST. LOUIS, Mo., May 24, 1915.

Machine tool business continues light and the general impression is that inasmuch as orders for war material are not reaching here to any great extent, no marked change in the demand for machine tools will appear before the fall activities set in. Orders for a few tools are being entered each week, but no lists are coming out. Money continues easy so far as supply and rates go, but capital enforces a close inquiry as to the use of bonds for expansion.

The Robinson Fire Apparatus Mfg. Company, St. Louis, Mo., has increased its capital stock from \$225,000 to \$325,000 for the purpose of increasing its manufacturing capacity.

The Mogul Truck Company, 6100 Maple avenue, St. Louis, Mo., has bought a site 125 x 187 ft., and will erect a plant for the manufacture of trucks.

The Inland Machine Works, St. Louis, has filed notice of an increase in its capital stock from \$8000 to \$30,000.

Caruthersville, Mo., will receive bids until June 2 for equipment for a sewage pumping station, with motor-driven centrifugal pumps, boiler, feed pump, etc. W. D. Byrd is mayor, and the engineer in charge is Frank L. Wilcox, Syndicate Trust Building, St. Louis.

The Edgar W. Kirk Soap & Cleanser Company, Edina, Mo., is in the market for engine, boiler, pumps, tanks, power and special equipment.

Montrose, Mo., will install a complete electric light system and is receiving bids for equipment, including an oil engine plant, generating apparatus, etc. E. T. Archer & Co., New England Life Building, Kansas City, Mo., are the consulting engineers.

Additional equipment to cost about \$17,000 will be installed in the electric light and waterworks plants of the city of Gallatin, Mo.

The Swanson Lumber Company, West Plains, Mo., has been incorporated with a capital stock of \$16,000 by C. E. and K. S. Swanson and M. E. Morrow.

A branch plant for western trade will be equipped at Kansas City, Mo., by the Firestone Tire Company, Akron, Ohio. Its capacity has not been determined.

Springfield, Mo., will spend about \$50,000 on the equipment of a sewage disposal plant.

An engine, boiler and other power equipment is wanted by the Prairie View Rice & Land Company, Hunter, Ark., of which E. Mathis is secretary. About 70 hp. is the contemplated capacity.

The Farmers' & Merchants' Gin Company, Maysville, Ark., has been incorporated with a capital stock of \$15,000 by R. J. Wigley, W. E. Bailey and J. R. Hamm.

The Arkansas Natural Gas Company, Little Rock, Ark., will equip a pipe line with pumping machinery to cost about \$50,000, in the Red River district.

Ashdown, Ark., will equip a waterworks plant to cost about \$13,000. Winters & Dove, Ft. Smith, Ark., are the engineers.

Water Improvement District No. 2, Paragould, Ark., will install waterworks equipment to cost about \$28,000. W. B. Rollins, Kansas City, Mo., is the engineer in charge.

The Choctaw Cement & Lime Company, Hartshorne, Okla., will complete the cement mills of the Choctaw Portland Cement Works, which it has acquired. The capital stock is \$400,000.

The Farmers' & Merchants' Gin Company, Tupelo, Okla., has been incorporated with a capital stock of \$17,000 by R. E. Galloway, J. A. Vincent, and others.

The Board of Trustees of Bromide, Okla., will expend about \$15,000 in equipping an electric light plant and waterworks pumping plant. The Benham Engineering Company, Oklahoma City, Okla., is in charge of plans.

The Hollingsworth Threshing Machine Company, Enid, Okla., has been incorporated with a capital stock of \$15,000 by W. A. Hollingsworth and J. B. Milton, Enid; and Frank Chesley, Tulsa, and will equip a manufacturing plant.

The Oklahoma Motor Plow Company, North Muskogee, Okla., has been incorporated with a capital stock of \$100,000 by J. R. Harris and B. F. Campbell, Fayetteville, Ark., and J. A. Lawrence, Tahlequah, Okla., and will equip a plant for plow manufacture.

The Bienville Lumber Company, Alberta, La., will equip a sawmill, planing mill, dry kilns, etc. for a daily capacity of 125,000 ft. of lumber. W. A. Davenport is president and manager.

The Orr Modern Motor Car Company, Yazoo City, Miss., has been incorporated with a capital stock of \$2,000,000 by Harry Priestly and J. W. Hincheliff, Vicksburg, Miss.; Joseph Weinberg, Greenville, Miss.; William Shields, Durant, Miss., and F. J. Flournoy, Canton, Miss., and will equip to manufacture a patented device for automobiles.

King & Anderson, Clarksdale, Miss., will equip a garage and motor repair plant, installing about \$5000 of mechanical equipment. Charles O. Pfeil, Memphis, Tenn., is in charge of the plans.

Clarksdale, Miss., will spend about \$150,000 on additional waterworks and electric light plant equipment, sewage disposal plant, etc.

The Louisiana Gravel Company, Jennings, La., has been incorporated with a capital stock of \$50,000 by George Hathaway, J. P. Black, R. E. Erwin and H. L. Davis, and will install gravel recovery apparatus.

The Fullerton-Stuart Lumber Company, East St. Louis, Ill., has been incorporated with a capital stock of \$50,000 by S. H. Fullerton, R. W. Fullerton and C. W. Reighard, St. Louis, Mo., and will install equipment.

The plant of the Gulf Wood-working Company, New Orleans, La., has been burned. It will be re-equipped, about \$8000 of machinery being required for making cooperage stock.

The Worthington Construction Company, Viterbo Building, Lake Charles, La., has the contract for construction work for which about \$900,000 has been made available in Calcasieu Parish.

The Rapides Gravel Company, Woodworth, La., is preparing to equip a screening and washing plant of 20 cars a day capacity. George K. Force is president.

Texas

AUSTIN, TEX., May 22, 1915.

Unusual activity in the improvement of public utility plants is noted. More progress is now being made in electrical development in Texas than ever before. Many plants in the smaller towns have passed into the hands of strong companies, and this merger movement now extends to almost every part of the State. On the whole, the machinery and tool trade is in very satisfactory condition.

The City of Magnolia Park has just issued \$40,000 of bonds for street improvements and \$94,000 of bonds for the construction of a waterworks system.

The Southwestern Craine Silo Company, Amarillo, has been organized to manufacture silos. H. W. Galbraith is a stockholder.

The Sharpe Electric & Machine Company, Abilene, Texas, will establish a plant for general machine work. It will be driven by electric motors. Part of the equipment is being

moved from a shop at Marshall, but new tools, such as lathes, drill presses, shaping and milling machines will be required. A metal finishing plant will also be installed. J. H. Sharpe is the proprietor.

The Texas Interlocking Stave Silo Company, Sulphur Springs, will soon begin the manufacture of stave silos.

The Graham Mill & Elevator Company, Graham, will build a grain elevator at Megargel of 8000 bu. capacity.

The Pacific Northwest

SEATTLE, WASH., May 20, 1915.

Two recent occurrences have served to stimulate a revival of interest in the lumber industry in the Northwest. The first was an order for 300,000 railroad ties placed by the Spokane, Portland & Seattle Railway Company, Portland, to be used for renewals of work during 1916. The order will require about 12,000,000 ft. of timber, board measure, and the mills in and adjacent to Portland will probably handle the bulk of the contract. Deliveries are to commence immediately. The second is the purchase by the Port Blakely Mill Company, Port Blakely, of five lumber schooners recently operated by the Globe Navigation Company, bankrupt. The vessels have a carrying capacity of 5,000,000 ft. and will do much to relieve the condition in the lumber industry prevailing at this time because of shortage of ocean tonnage.

The present congestion of freight bound for the Orient, due to lack of vessels to transport same, is absolutely unprecedented in the Northwest, and shippers hope for little relief in the near future. The crippling of the steamship Minnesota only added to a bad situation, and every vessel leaving the Pacific ports is loaded to her extreme capacity. Part of the difficulty is due to the absence of the Canadian Pacific liners from the trans-Pacific trade routes.

The machinery business remains normal, with a fairly hopeful outlook. Inquiries for large quantities of road-working machinery, power plant equipment, and water supplies continue to appear from various municipal sources, although not many orders have materialized. Collections show little change.

The warehouse and plant of the Holly Mason Hardware Company, at Spokane, Wash., were damaged by fire recently with a loss of \$50,000.

Plans for the large sawmill to be built in Roseburg, Ore., by Kendall Brothers are now being prepared by R. S. Jobson. It will have a capacity of 250,000 ft. of finished lumber daily. The company also plans the construction of a railroad from Roseburg to the line of the Cascade National Reserve. The plant, when completed, will cost approximately \$500,000.

Judith Gap, Mont., has commissioned Gerharz & Jaqueth, engineers, Great Falls, to prepare plans for a water system to cost about \$20,000.

F. E. Bethea, Washougal, Wash., is preparing to reclaim about 2000 acres of bottom land at an estimated cost of \$25,000. A drainage system will be built.

The Spokane-Astoria Terminal Company, Yeon Building, Portland, has acquired about 2500 ft. of water frontage in Warrenton, Ore., on which it plans the erection of grain elevators and warehouses, to cost approximately \$150,000. Plans are now under way. Walter S. Hidden is president.

Active construction on the central heating plant to be built in Tacoma by the Tacoma Central Heating Company, Tacoma, will begin within thirty days. The plant will cost about \$250,000.

The Trestle Creek Power Company, Sandpoint, Idaho, of which Ralph Reinerston is president, announces that work on the proposed 680-hp. hydroelectric plant to be built at Trestle Creek will begin as soon as materials can be purchased and delivered.

The port of Astoria, Ore., has instructed Chief Engineer Walsh to prepare plans and estimates of cost for constructing grain elevators, warehouses, etc., at the port docks at Smith's Point. Plans will cover a project to cost not less than \$750,000.

J. G. Kelly, consulting engineer, Portland, Ore., is preparing plans for a municipal water system for Reedsport, Ore., estimated to cost \$100,000.

The Stevens County Light & Power Company, Meyers Falls, Wash., has leased water power in the Colville River and will begin development work. About 3000 hp. will be generated to supply adjoining towns and mining properties. A. H. Sperry is president and R. G. Williams, resident manager.

The Anchor Fish Company, Anacortes, Wash., recently incorporated for \$50,000, has taken over the building of the Anacortes Creamery & Produce Company, and will convert it into a salmon cannery. C. F. Wise is president.

The Richmond Beach Brick Company, Mt. Vernon, Wash., has been organized by E. Branchflower, J. Ptezelberger, S. L. Moody, and others. It has a capitalization of \$70,000.

The Chelan Electric Company, Wenatchee, Wash., proposes to construct a hydroelectric power plant at Lake Chelan.

The Franklin Tile & Culvert Company, Billings, Mont., has filed articles of incorporation with capital stock of \$75,000. It will erect a plant for the manufacture of concrete. W. H. Franklin, T. F. Pollard, R. J. Fleming, and others, are the incorporators.

The Pioneer Paving & Roofing Company, Cheyenne, Wyo., will move its plant to Billings, Mont., where the plant will be enlarged and improved. The company will manufacture laundry trays and will install equipment to manufacture gravel roofing, cement and plaster work, construct building blocks, fence posts, floors, curbs, foundations and reinforced concrete construction.

The Ocean Food Packing Company, Everett, Wash., recently organized with a capital stock of \$25,000, will locate a canning plant with a capacity of 50,000 to 60,000 cases per year. O. J. Foster, C. W. Miley and G. A. Brown are prominent stockholders.

San Francisco

SAN FRANCISCO CAL., May 18, 1915.

Business in machine tools is less active than last month. Unseasonably heavy rains and a feeling of hesitancy due to war developments are held responsible for a slight reaction which is believed to be only temporary. Notwithstanding some crop damage, implements and agricultural machinery continue to lead in activity. Large shipments of such goods are coming by the Panama Canal, while local manufacturers' are well occupied. Some activity is also noted in mining machinery, with numerous inquiries from Nevada for compressors, etc., and local interests expect some benefit from a proposed direct steamer line between San Francisco and Alaskan ports. More shipbuilding business is appearing, and a tendency toward improvement is evident in building. The Australian demand for local gas engines has been cut off, but a fair domestic trade is reported. General foundry trade continues extremely quiet.

The roundhouse, machine shops, car shops and a great deal of rolling stock of the Alaska Northern Railway, Seward, Alaska, were destroyed by fire May 12. The total loss is estimated at \$100,000. Whether the shops will be replaced is uncertain.

It is announced that the property of the Globe Iron Works, Sacramento, Cal., including several buildings and a large shop outfit, is to be sold shortly by the trustees to meet obligations of \$80,000.

The J. H. Burnett Iron Works, Fresno, Cal., is preparing to engage in the manufacture of a lock-nut and bolt.

According to report W. H. Sheasby, Berkeley, Cal., is working on a project for the establishment of a steel converter at Monterey.

The Monterey Packing Company is starting work on a cold storage plant at Monterey, Cal.

The Craig Shipbuilding Company, Long Beach, Cal., has taken a contract for a Government lighthouse tender, to be equipped with a 1300-hp. engine.

The Gibraltar Consolidated Mining Company, Downieville, Cal., is preparing to install a new hoisting engine.

The Montebello Oil Company, Fillmore, Cal., is preparing to build a refinery at a cost of about \$100,000.

The town of Calexico, Cal., is taking bids for a 75-hp. motor direct-connected with a three-stage centrifugal pump.

The Western Gas Engine Company, Los Angeles, has taken a contract to furnish the new municipal pumping plant for the town of Escondido, Cal., at \$8958.

Techachapi, Cal., has voted \$8000 of bonds for a municipal electric light plant.

The National Ice & Cold Storage Company has announced its intention of building a pre-cooling plant at Tracy, Cal., to be ready for the 1916 fruit season.

Western Canada

WINNIPEG, MAN., May 22, 1915.

Machinery dealers report a fair demand for some kinds. A steady, although slow, improvement appears in the call for machinery parts. Some of the lumber mills which recently started up work are fairly good buyers, but no big contracts are reported. A few municipalities are arranging to raise money for various utilities. The general financial situation has not yet become much easier.

George Malcolmson, Winnipeg manager of the Ford Motor

Car Company, announced that the construction of the big assembling plant at Winnipeg will start soon.

The National Elevator Company, Ltd., Port Arthur, Ont., has decided to build a new elevator to replace one which burned recently.

The Alberta authorities will install a 125-kw., direct-current generator at the new penitentiary, Ft. Saskatchewan.

Kamsack, Sask., has passed a by-law authorizing the expenditure of \$35,000 on waterworks improvements.

The Yorkton Creamery Company, Ltd., Yorkton, Sask., is preparing to erect a larger building and install new, up-to-date machinery.

The Consolidated Motor Company, Ltd., Vancouver, B. C., has been incorporated, with a capital of \$25,000, to manufacture motors, etc.

The Imperial Lumber Yards at Laford, Sask., were damaged by fire to the extent of \$5000.

The City Council, Kelowna, B. C., will construct a municipal hydroelectric plant to cost \$120,000. DuCane, Dutcher & Co., of Vancouver, B. C., are the engineers.

D. W. Sutherland, Kelowna, B. C., will build a broom factory there.

MacKenzie Brothers, Ltd., Winnipeg, Man., has been incorporated with a capital of \$100,000, to manufacture articles from iron, etc. John MacKenzie, W. J. Moran, Gordon MacKenzie, and others are the incorporators.

Incorporation has been granted at Ottawa to the Manitoba Universal Farm Tractor Company, Ltd., Winnipeg, to manufacture machinery. The capital stock is \$50,000. The incorporators are William Brydon, Hubert I. Call, Charles McPherson, and George H. Vowles, all of Winnipeg.

Eastern Canada

TORONTO, ONT., May 24, 1915.

Orders being received by Canadian manufacturers for shrapnel and high explosive shells are steadily increasing. According to the statement of the chairman of the committee appointed by the Canadian Government to place these orders, every available machine shop, railroad shop, and other plant capable of turning out shells or parts is being employed. A total of 10,000 shells is now being shipped daily, and by July 1 it is expected to raise the daily average to 40,000. Up to a week ago about 430,000 shells had been shipped.

Manufacturers of sawmill machinery have been experiencing an improved demand of late, and some of them have been running their plants full time.

The Canadian Cartridge Company, Hamilton, Ont., is to erect a factory, 100 x 300 ft., at a cost of \$30,000. A boiler house and a machine shop are also to be built.

The Department of Naval Service is in the market for a 30-ton steam wharf crane for the dockyard at Halifax. Tenders close July 1. G. J. Desbarats, Ottawa, is deputy minister.

A brush and broom factory is to be started in Montreal by James O'Sullivan under the style of the Montreal Mfg. Company.

The public utilities commission, London, Ont., contemplates the purchase of new hydraulic pumps.

Hull, Que., will receive tenders up to June 7 for one waterwheel of 1200-hp., one waterwheel governor, one set of double helical gears, one 600-kw., 2200-volt, two-phase, 60-cycle generator, and one centrifugal pump of 5500 gal. per min. capacity under 280-ft. head. J. P. Albert Laforest is city engineer.

Additions are to be made to the brush and broom factory of the Stephens-Hepner Company, Ltd., Port Elgin, Ont.

Legault, Leger & Bourgon, Montreal, is the style of a company registered to manufacture sashes and doors.

Charles Robinson has erected a sash and door factory at Ayer's Cliff, Que., and will install new machinery.

Dorchester, Ont., has decided to install the Provincial hydroelectric system.

A factory, 60 x 90 ft., is being erected at Walkerville, Ont., by the Hartwell Brothers Company, manufacturer of implement handles. It is a branch of a Chicago concern.

Plans are completed for the new pumping station at Middle Lake for the city of Sydney, N. S. The plant will have a capacity sufficient for a population of 70,000.

The factory of the National Mattress Company, 342 Gerrard street, Toronto, has been damaged by fire with a loss of \$25,000. A great deal of expensive machinery was destroyed.

Plans are being prepared for an addition to the plant of the North American Chemical Company, Goderich, Ont.

Stamford Sand Company, Niagara Falls, Ont., is in the market for gravel screening equipment.

The Oakville Basket & Veneer Company, Ltd., Oakville, Ont., is to purchase a 40-hp. engine to couple direct to line shaft.

A 50-hp. horizontal high-speed steam engine is to be purchased by the McQuay Tanning Company, Ltd., Owen Sound, Ont.

F. A. Gordon, of the Board of Trade, Sarnia, Ont., proposes erecting a flaxmill at Petrolia, Ont. He expects to spend \$6000 on power machinery, gas plant, etc.

The Cordova Mines Company, Ltd., Deer Lake, Ont., is to purchase a compression plant to replace one destroyed by fire. P. Kirkegaard is manager.

The Luitweiler Pump Company, 291 Dundas street, London, Ont., is in the market for a plant for the manufacture of pumps.

Charles Wheeler & Sons, needle manufacturers, Paris, Ont., are to remove their plant to Georgetown, Ont.

St. Joseph de Levis, Que., proposes to extend its sewage and waterworks system at an estimated cost of \$150,000. Gauvin & Beauchemin are the engineers, and H. Bourassa is town clerk.

The D. J. Barber Foundry Company, Ltd., Brighton, Ont., is to build an addition to its foundry. L. D. Ross is managing director.

The Lord & Burnham Company, Irvington-on-Hudson, N. Y., is to erect a plant at St. Catharines, Ont., to cost \$100,000, for the manufacture of materials for greenhouses. It is expected that the plant will have an annual output of \$350,000 to \$500,000 in value. Iron and wood-working machinery will be required.

The Dominion Road Machinery Company, Ltd., Goderich, Ont., has been incorporated with capital stock of \$300,000 to manufacture road machinery, automobiles, etc. William L. Horton, Jacob W. Kitts, Robert C. Hayes, Curtis L. Moore, all of Goderich, and Samuel J. Phillips, Kennett Square, Pa., are the incorporators.

The Mico Bottling Company, Ltd., Toronto, has been incorporated to manufacture machines and appliances for the preparation of beverages. The capital stock is \$40,000. Kenneth McLachlin, Ottawa; Lewis Macnamara and Daniel McLachlin, both of Arnprior, Ont., are the provisional directors.

The Vacuum Gas & Oil Company, Ltd., Toronto, has been incorporated with capital stock of \$1,000,000. The provisional directors are William M. Alexander, Robert B. Lamb and Alexander P. Macauley, all of Toronto.

The sawmill at Round Lake, Que., owned by J. & W. Duncan, Ltd., Montreal, has been swept away through the bursting of a dam.

The Wallace Sawmill Company, Mt. Brydges, Ont., whose mill was recently destroyed by fire, contemplates rebuilding and purchasing new machinery.

George Hodgins, Wyoming, Ont., will purchase machinery for the manufacture of cement blocks.

Oliver Carlaw, Shelburne, Ont., is in the market for a shingle machine and jointer.

J. McMullin is having plans prepared for a grist mill to be constructed at Arranvale, Tara P. O., Ont.

Horn Brothers, Lindsay, Ont., will commence the construction of a building next October to replace the one destroyed by fire. The factory will cost \$55,000 and machinery to the amount of \$75,000 will be installed.

The Ridgetown Milling Company, Ridgetown, Ont., will rebuild its plant, recently destroyed by fire with a loss of \$30,000. A. S. Blight is manager.

The Rathbun Match Company, Ltd., will build a match factory at Deseronto, Ont. H. W. Rathbun is president.

George Rivers, Akron, Ont., will erect a basket factory at Strathroy, Ont., to cost \$6000.

The St. Clair Foundry Company, Toronto, Ont., has received a permit and will construct an addition to its factory to cost \$2000. Work will be started at once.

The Canadian Niagara Power Company, Niagara Falls, Ont., will shortly commence work on improvements to its plant to cost \$3,000,000.

Peterboro, Ont., is contemplating the installation of an electrically operated auxiliary pumping plant. W. Buller is chairman of the board of works.

The lumber yards and sheds of H. Dupius & Sons, Hull, Que., were destroyed by fire with a loss of \$8000.

Fire did \$25,000 damage to the Richard Smith & Sons' lumber mill at Niagara Falls, Ont. The building and machinery were a total loss.

The Exolon Company, Thorold, Ont., will erect a steel and brick addition to its plant to cost \$20,000. The addition will require 1200 hp.

The Beaver Fire Board Company's factory, Thorold, Ont., was damaged by fire on May 11 to the extent of \$18,000.

Under an agreement proposed to be made by the Newfoundland Government with the Newfoundland Products Corporation, Ltd., represented by T. L. Willson, of Woodstock, Ont., with whom is associated the Reid-Newfoundland Company, a sum of over \$16,000,000 will be spent on the construction and equipment of large plants in Newfoundland and Labrador. It is proposed to establish at Bay of Islands an industry for the manufacture of chemicals, wood pulp and lumber. The sawmills are estimated to cost \$211,800, and the sulphite pulp mills, electrolytic bleaching plants and works for the manufacture of wood preparations will involve an expenditure of \$1,568,300.

The Little Bonaventure Lumber Company, Ltd., Quebec, Que., has been incorporated with a capital of \$20,000 to manufacture lumber, etc. The incorporators are J. Ferlatte, and others.

The McNeil Machine & Motor Company, Ltd., Glasgow, N. S., has been incorporated with a capital of \$150,000, to manufacture machinery, motors, etc.

The Hamilton Lock Nut & Specialty Mfg. Company, Ltd., Hamilton, Ont., has been incorporated with a capital of \$500,000, by Melvin J. Dunham and A. N. Wells, both of Middletown, N. Y.; W. J. Sutterby, Hamilton, Ont., and others, to manufacture sheet metal, screws, bolts, lock nuts, tools, etc.

The R. McDougall Company, Ltd., Galt, Ont., has been granted a license to increase its capital stock from \$30,000 to \$250,000, and to extend the powers of the company to manufacture wood-working machinery, tools, engines, boilers, power machinery, implements, etc.

Cartierville, Que., is to install a waterworks system, including a filtration plant. F. A. Grothe is mayor.

Government Purchases

WASHINGTON, D. C., May 24, 1915.

Bids will be received by the Bureau of Supplies and Accounts, Navy Department, Washington, June 8, schedule 8322, for two turbo-generating sets for Boston; schedule 8315, one scroll and resawing machine for Norfolk; schedule 8316, one double action toggle press for Washington, D. C.; schedule 8318, one open side planing machine for Norfolk; schedule 8319, for 11 portable radial drills and 10 electric bench grinders, all electrically driven, for Brooklyn; schedule 8323, four 23-in. sliding head drills, eight 7½-in. x 13¼-in. bench grinders, four screw cutting engine lathes, four turret lathes and two turret threading attachments, two bar and chuck work turret lathes, four automatic screw machines, two turbine bucket cutting machines, two milling machines, three constant speed universal milling machines, two 20-in. shaping machines of gear-box and extension base type and two 14-in. toolroom shaping machines, all for Newport; until June 15, schedule 8330, nine 3-ton pneumatic hoists for Mare Island; until June 22, schedule 8342, for one electrolytic oxygen-hydrogen generating plant for Puget Sound; schedule 8343, for one circulating pump for Mare Island.

The chief of Bureau of Yards and Docks, Washington, will receive sealed proposals until 11 a. m., June 12, for one locomotive crane for the Boston navy yard.

The Secretary of the Interior, Washington, D. C., will receive sealed proposals until 2 p. m., June 8, for furnishing stokers, coal and ash handling machinery, etc., for the powerhouse of the Government Hospital for the Insane, Anacostia, D. C.

The supervising architect, Treasury Department, Washington, will receive sealed proposals until 3 p. m., June 24, for an oil-burning plant for heating boilers at the United States Marine Hospital, Port Townsend, Wash.

Westinghouse mazda C lamps are now available in sizes from 200 to 1000 watts for 220 to 250 volts. Heretofore these mazda C lamps (which are the latest development in incandescent lamps and among the most efficient lighting units available) have been supplied only for 105 to 125 volts. The manufacture of this type of lamp has progressed so rapidly, however, that the Westinghouse Lamp Company, 1261 Broadway, New York, is now able to furnish them for the higher voltages. In appearance they resemble the 105 to 125-volt lamps.

Some Recent Publications

The National Association of Manufacturers, 30 Church street, New York, has issued "A Handbook of the Federal Trade Commission Act." This is a pamphlet of 64 pages, which has been prepared for the association by James A. Emery. It gives the full text of the act creating the commission, together with its legislative history, an outline of the personnel of the commission and a digest of its apparent powers, duties and procedure. Special attention is given to those features of the act which developed the greatest differences of opinion during its legislative consideration. Attached to the statement are copies of the Clayton act, the Sherman act and other related legislation. A diagram is included outlining the powers and procedure of the commission. This document is most timely, as it will enable manufacturers and others interested to make an intelligent study of this important piece of legislation.

"Trade of the United States with Other American Countries, 1913-1914," is the title of a booklet just published by the Bureau of Foreign and Domestic Commerce, Department of Commerce. American manufacturers and producers in all lines will find this document of practical value in determining the kinds, quantities and values of merchandise exported from the United States to each country of the Western Hemisphere, with annual purchases amounting to two billions of dollars. "Miscellaneous Series No. 23" is the official designation of the booklet, which will be sold by the Superintendent of Documents, Washington, and by branch offices of the Bureau of Foreign and Domestic Commerce at New York, Boston, Chicago, St. Louis, New Orleans, Atlanta, San Francisco and Seattle at the nominal price of 20 cents per copy.

The New Haven Manufacturers' Exhibit, Inc., 673 Chapel street, New Haven, Conn., has issued an index guide of "New Haven Made Goods." This contains an alphabetical list of the products of the manufacturers of that city with a list of manufacturers whose products are covered. To make this list of value for rapid use the telephone number is given after the name as well as the street address. Mention is also made in the pamphlet of the permanent exhibit of goods made in that city. This is the first permanent exhibit of its kind in any city of the United States and is open to the public during ordinary business hours without charge.

The Associated Metal Lath Manufacturers, 812 Wick Building, Youngstown, Ohio, has published a metal lath handbook. It is designed to place before architects and contractors in a concise form the best method of using metal lath, together with illustrations and descriptions of the various kinds. A condensed record of various scientific experiments, especially in the way of fire tests that have been made to determine fundamental data affecting the use of metal lath, is included. The price of the handbook is \$1.00.

The Stamford, Conn., Board of Trade has issued its year book for 1915. In addition to a brief historical account of the town, considerable information is given on the various industries that are located there, some 43 different lines being mentioned. Data on the transportation facilities and the other inducements that are offered to industries to establish plants there are included. Numerous illustrations of the different industrial establishments and views of the town are shown.

D. Appleton & Co., New York, have published a 363-page revision of Ernest Elmo Calkin's "Modern Advertising." Its purpose is to cover the entire subject by setting down the fundamentals, suggestions being made as to methods of using more detailed works. A chapter is devoted to showing how manufacturers can use "the long arm of publicity to reach after new sales and new markets."

The School of Mines of the University of Minnesota has issued its "Maps of the Mining Districts of Minnesota" for 1915 in the usual blueprint form. The map of the region as a whole as well as the sectional ones of the Mesaba, Vermillion and Cuyuna ranges are brought up to date.

Judicial Decisions

ABSTRACTED BY A. L. H. STREET

WARRANTY IN SALE OF BOILER.—A contract for sale of a steam boiler contained a clause stating the number of "brick required for standard setting" and number of tile of specified size, but the number actually used largely exceeded the estimated number. Held that the clause must be deemed to have been a mere estimate, and not such warranty as renders the seller liable to the buyer for the cost of the larger number of brick and tile actually required. (Maine Supreme Judicial Court, Erie City Iron Works vs. Cushnoc Paper Company, 93 Atlantic Reporter 356.)

ASSUMPTION OF RISK BY EMPLOYEE.—An employee injured through insufficiency of a force engaged in handling a heavy machine cannot recover damages against his employer, if there was no foreman present directing the work, plaintiff understood the nature of the work, and additional assistance could have been procured had the men desired it. (Wisconsin Supreme Court, Karny vs. Malleable Iron Company, 151 Northwestern Reporter 786.)

MACHINERY SUBJECT TO MECHANIC'S LIEN.—Heavy machinery may be regarded as part of the real estate, so as to be subject to a mechanic's lien against the land, where the base has been bolted to a concrete foundation, although some of the parts may not yet have been fitted into place. (Kansas Supreme Court, Geppelt vs. Middle West Stone Company, 146 Pacific Reporter 1157.)

ONE-SIDED CONTRACT NOT BINDING.—A contract of sale is invalid for want of mutuality if it binds the buyer to accept delivery of goods up to a certain amount, but leaves the seller free to withhold delivery. (Missouri Supreme Court, Hudson vs. Browning, 174 Southwestern Reporter 393.)

EMPLOYER'S DUTY TO SAFEGUARD A STEEL RIVETER.—Where a steel riveter was required to use as a scaffold a plank across a space 16 ft. long, his employer may be found to have been negligent in not having a rope, which was attached to the middle of the plank to keep it from sagging, attached vertically instead of diagonally, where the plank slipped and thereby caused injury to the employee. (Wisconsin Supreme Court, Tucker vs. Skobis Bros. Company, 151 Northwestern Reporter 799.)

BUYER'S REMEDIES ON ACCOUNT OF DEFECTIVE MACHINERY.—When a seller of machinery innocently misrepresents its condition, the buyer is entitled to rescind his purchase on that ground, but not to enforce any claim for damages, on electing to retain the machinery. A seller of a second-hand engine, under representation that it has been overhauled and is as good as new, is liable for the buyer's expense in putting it in good condition, on it proving to be defective, and for the expense of hiring another engine pending the making of such repairs. (Alabama Court of Appeals, D. B. Lacy & Son vs. Kilby Locomotive & Machine Works, 67 Southern Reporter 754.)

CONTRACTOR IN MINING NOT AN EMPLOYEE.—A contractor for the removal of iron ore from a pit is not an "employee" of the iron company, within the meaning of the Alabama employers' liability act, where he is paid so much per ton for ore mined and delivered, employs and pays his own workmen, furnishes his own appliances, and is left free to determine the parts of the pit where he is to work. (Alabama Supreme Court, Hubbard vs. Coffin & Leake, 67 Southern Reporter 697.)

WHEN ONE BECOMES A JUNK DEALER.—When one is shown to have made sales of junk and old metals on 16 different dates within two months he must be deemed to be a "dealer" within the Massachusetts law which imposes a license tax on dealers in such articles. (Massachusetts Supreme Judicial Court, Commonwealth vs. Silverman, 108 Northeastern Reporter 358.)

ASSUMPTION OF RISK OF DEFECTIVE EYEBOLT.—A workman assumes the risk of being injured through insufficiency of the threads of an eyebolt to sustain the weight of a heavy casting if he knows of such insufficiency. (Indiana Supreme Court, Inland Steel Company vs. Kiessling, 108 Northeastern Reporter 232.)

Customs Decisions

STEAM WINCHES TRANSFERRED TO OTHER VESSELS

The Court of Customs Appeals has rendered a decision that will no doubt have a broad bearing in view of the large number of foreign vessels detained in American ports because of the European war. Eight steam winches, brought into the country by the Hamburg-American steamship Pretoria and transferred at the port of New York to the Carl Schurz and Emil L. Boas, steamships of the same line which were there undergoing extensive alterations in contemplation of a change of service, were classified as steam engines and assessed for duty at 30 per cent. under paragraph 197 of the act of 1909, corresponding to paragraph 165 of the present law. The importers protested, claiming that the winches were part of the equipment of the vessels to which they were transferred and, therefore, free of duty under the navigation laws as amended by the act of March 3, 1897, which is in part as follows:

Sec. 17. * * * Sea stores and the legitimate equipment of vessels belonging to regular lines plying between foreign ports and the United States delayed in port for any cause may be transferred in such port of the United States under the supervision of the customs officers from one vessel to another vessel of the same owner without payment of duties, but duties must be paid on such stores or equipments landed for consumption, except American products.

The Board of General Appraisers sustained the protest, whereupon the Government appealed. In construing the section of the navigation laws quoted, the court holds that to entitle such goods to free entry they must, first, be equipment of a vessel "delayed in port" and belonging to a regular line plying between foreign ports and the United States; second, they must be the legitimate equipment of such vessel, "that is to say, equipment prudent to provide and reasonably necessary for the proper, efficient and safe performance of the service in which the vessel is engaged or is about to engage," and, third, they must be transferred in the port in which the vessel is delayed, from one vessel to another of the same owner, under customs supervision. It is conceded that in this case the vessels to which the transfers were made were delayed in port and that the winches were transferred from one vessel to another of the same owner, hence but one question is presented by the appeal and that is, were the winches at the time application was made for their transfer legitimate equipment of the vessels for which they were intended? This question the court answers in the negative, holding that the winches under consideration were never on board the two vessels until transferred from the Pretoria, and that neither of the vessels had ever been equipped with steam winches, which, on the contrary, were placed on board, not to enable them to perform the service previously performed, but to "add to their efficiency in handling cargoes in their new line of service." The winches in question, the court holds, might be held to be "equipment for the vessels, but not equipment of the vessels," and, therefore, not eligible to free entry under the statute quoted.

The Board of United States General Appraisers has taken adverse action on protests filed by Herman Boker & Co., New York, regarding the rate of duty accruing on steel strips imported under the tariff act of 1909. They were classified under the provision in paragraph 135 reading "steel in strips, not thicker than No. 15 wire gauge and not exceeding 5 in. in width." This called for an ad valorem duty of 35 per cent. The importers claimed the strips properly dutiable at 1 2/10c. per lb., under paragraph 130, as "sheets or plates of iron or steel." The board held that the testimony failed to substantiate the claim. The same firm was also overruled in protests dealing with the entry under the old tariff of flat steel wire. In this case the claim was for duty at 35 per cent. as steel in strips, but the board decided that the collector's assessment of 45 per cent. as metal manufactures was correct.

The E. W. Bliss Company, Brooklyn, N. Y., has opened a Detroit office at room 2011, Dime Bank Building.

Trade Publications

V-Notch Meters.—Harrison Safety Boiler Works, North Philadelphia Station, Philadelphia, Pa. Engineering leaflet No. 18. Contains a reprint of two papers on the V-notch weir as used in the Cochrane metering heater. The first describes the tests made at the Glasgow University in 1907-1909, by which the fact was established that with a V-notch weir, the true discharge for given conditions could be determined within 0.333 per cent. The other treats of a commercial testing apparatus of large capacity installed for the purpose of carrying out an extensive series of tests on V-notch weirs of different dimensions as actually installed in commercial meter chambers.

Elevating Factory Trucks.—Lewis-Shepard Company, 262 Dover street, Boston, Mass. Pamphlet. Illustrates and describes an elevating factory truck for use in connection with the system employed at present in factories for placing stock and material on platforms and moving the loaded platforms instead of piling and unpling the material. The special features of the truck are the use of steel throughout with the exception of the wheels which are of gray iron, vertical elevation and lowering, freedom from shock or jar and the use of short strokes to raise the load. All of these features are touched upon, the text being supplemented by illustrations.

Planing Machines.—Cincinnati Planer Company, Cincinnati, Ohio. Calendar. Presents illustrations of massive heavy-duty machines equipped with belt, speed box and reversing motor drives.

Street Cleaning Machinery.—Studebaker Corporation, South Bend, Ind. Booklet. Is designed to give some idea of modern street cleaning machinery and to furnish statistical information and suggestions regarding the cost and efficiency of various methods of street cleaning, sprinkling, oil distribution, etc. It is intended to offer methods of maximum efficiency and economy. The booklet is especially valuable to superintendents of factory grounds and industrial communities.

Gas Engines.—Hoopston Gas Engine Company, Hoopston, Ill. Catalogue. Discusses and illustrates a type of gas engine, the special features of which are the use of an electric instead of a flyball governor to maintain speed, starting as a two-cycle engine and automatically changing to a four-cycle unit and the absence of gears or secondary machinery. These engines are made in 7 to 20 hp. truck and skid models. The principles of their construction were explained in *The Iron Age*, January 14, 1915.

Bearing Bronze.—Lumen Bearing Company, Buffalo, N. Y. Booklet. Explains the properties of a non-phosphor bronze which is adapted for thrust collars and bearings designed to carry unusually heavy loads. Special claims for this bronze are a lower coefficient of friction, durability, high compressive strength and a lighter weight than ordinary bronze.

Leather Belting.—Bonner & Barnewall, Inc., 30 Church street, New York City. Booklet. After an introductory chapter on buying belting and rules to determine the width necessary to transmit a given horsepower and the length of belts, the manufacture of Bonbar reinforced belts is taken up in some detail. The special claims made for it are that the stretch is minimized and a greater flexibility and longer life are secured.

Bridge and Steel Construction.—Dominion Bridge Company, Ltd., Montreal, Canada. Catalogue No. 8 1. Size, 8½ x 11½ in.; pages, 104. Contains many excellent illustrations of installations with a brief account of each and, in some instances, interesting details of climatic conditions and other difficulties encountered in construction. The illustrations include the Lachine bridge with a continuous span of 1356 ft., railroad bridges, swing and vertical lift spans, bascule lift bridges, viaducts, plate girder spans, structural steel work for railroad shops and stations, manufacturing plants, office buildings, coal and ore handling plants and other miscellaneous steel work.

Nuts and Bar Iron.—Milton Mfg. Company, Milton, Pa. Two booklets. The first illustrates a line of large nuts for engine manufacturers and the other calls attention to several grades of bar iron for railroad, machine shop, general locomotive and staybolt work. Tables giving the sizes of flats, squares and rounds in which these brands may be had are included.

Tapping Machines.—National Machinery Company, Tiffin, Ohio. Tapper talk No. 3. Calls attention to a line of nut tapping machines with special emphasis on the new automatic machine illustrated in *The Iron Age*, January 28, 1915.

Wood Block Floors.—Ohio Wood Preserving Company, Commonwealth Building, Pittsburgh, Pa. Booklet B. Points

out the advantages of using creosoted wood blocks for the floors of factories, shops and all interior uses where wearing quality, elasticity, sanitation and economy are prime requisites. The features of the blocks such as service, cost, comfort and efficiency are briefly discussed. Illustrations showing how a floor is laid are included, together with views of a number of plants in which the floor has been installed.

Boring, Drilling and Milling Machines.—Lucas Machine Tool Company, Cleveland, Ohio. Two booklets. Treat of the efficiency of the Lucas Precision machine with emphasis on the feature that boring, drilling and milling operations may be performed without changing the set-up of the work. Illustrations show the machine in a number of operations, the parts in detail, and are supplemented by a description of all the features of the machine.

Ball Bearings.—S. K. F. Ball Bearing Company, 50 Church street, New York City. Bulletin No. 25. Mentions the use that is being made of ball bearings in machine tools and shop equipment. After a brief discussion of the construction of the ball bearings, the text of which is supplemented by engravings, the various machines that are equipped with ball bearings are illustrated and brief statements made as to the results that have followed their use. The machines covered include sensitive drilling, planing, milling, grinding, gear cutting and broaching machines, as well as lathes and several special machines, electric motors, shafting hangers, etc. Instructions on the mounting and care of ball bearings are included.

Geared Elevator Machine.—R. M. Rogers & Co., 74 Emerson place, Brooklyn, N. Y. Circular. Describes briefly a self-retaining geared machine for use in connection with hand power invalid or trunk lifts ranging in capacity from 300 to 650 lb. The car is held against movement in either direction by a self-locking device. An illustration of the machine is presented, together with a brief table of the sizes that can be supplied.

Electric Lights.—Cooper Hewitt Electric Company, Eighth and Grand streets, Hoboken, N. J. Bulletin No. 59. Gives illustrations of the use of the company's electric lamps for the illumination of signs. One of the particular advantages claimed for the use of these lamps is the absence of halation due to the throwing of light from the lamps directly on the sign instead of outlining the letters of the sign with incandescent lights. A diagram showing the method of mounting the lamps for illuminating the sign is included.

Gears, Pinions and Trolleys.—R. D. Nuttall Company, McCandless avenue and Harrison street, Pittsburgh, Pa. Catalogues Nos. 12 and 13. The first illustrates and briefly describes a large line of mine and industrial locomotive gears and pinions for standard mine locomotives, mining machine gears and pinions, mine, industrial haulage and standard trolleys, flexible and spring couplings, etc. It also contains data and formulae for determining the diametral and circular pitches of gears and rules for ordering. No. 13 is devoted to electrical railway gears, pinions and trolleys, illustrating types for standard equipment, a variety of bases for standard and shoe and roller types of the pantograph trolleys, trolley harps, wheels, parts, etc.

Riveting Machines.—Vulcan Engineering Sales Company, 2061 Elston avenue, Chicago, Ill. Catalogue No. 3, fifth edition. Illustrations and descriptive matter explain the operation of a line of pneumatic riveting machines in which a combination toggle and lever action is used. Lists of the different sizes of machines are given together with drawings and engravings of various parts. An illustrated description of one of these machines appeared in *The Iron Age*, April 8, 1915.

Water Filters.—Hygeia Filter Company, Detroit, Mich. Four circulars. Cover a line of stone water filters for factories and other places where a large supply of pure water is required. The construction is explained at some length, the text being supplemented by drawings, showing the arrangement of various parts.

Wagon and Truck Loaders.—Jeffrey Mfg. Company, Columbus, Ohio. Bulletins Nos. 165 and 166. The first illustrates and describes the Jeffrey portable and self-propelled wagon and truck loader for handling bituminous and anthracite coal from storage bins or yard piles. This machine, handling coal up to 6-in. cubes, has a capacity of 1 to 1½ tons per min. The second bulletin covers a similar machine for handling crushed stone, sand, etc.

Grinding and Polishing Machinery.—Valley City Machine Works, Grand Rapids, Mich. Illustrates the company's line of bench and floor grinding, polishing and buffing machines, special features of which are the wick oiling device and the Valley City adjustable protection and exhaust hoods. The grinding machines include both wet and dry types and the buffing and polishing machines can be used as combination grinders and polishers.

